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EDWARD T. TAYLOR
Leader in fight for better mining laws

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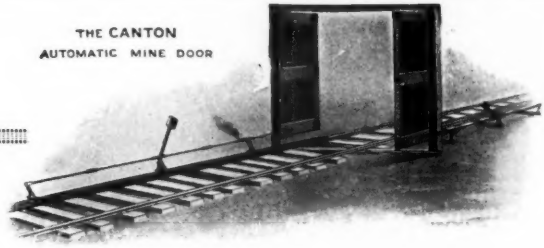

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The American Mining Congress is a voluntary association supported by the dues and fees of its members. It is striving to bring about:

First—Safety and efficiency in mining operations.

Second—Intelligent conservation with a view to the highest development and use of our mineral resources.

Third—The stimulation of investment in practical mining operations by showing that mining is a legitimate business when intelligently conducted.

Fourth—Uniformity in state laws governing mining operations carried on under like conditions.

Fifth—Such federal co-operation through research and investigation as will furnish the basis for intelligent state legislation, and will solve those problems of economical production, treatment and transportation which are essential to an increase in mineral production.

Sixth—The improvement of the economic conditions underlying the coal mining industry.

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Associate memberships are designed for those not actively interested in mining, but who are willing to assist a state Chapter of the Mining Congress in helping to develop the Mining industry within the State. All memberships include subscription to the MINING CONGRESS JOURNAL.

Every member of the Mining Congress should undertake to send in at least one application each month. Will you help by having the following blank filled in and mail to this office?

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VOL. 2, NO. 4 WASHINGTON APRIL, 1916

THE MINING CONGRESS JOURNAL

Official Organ of the American Mining Congress

ORGANIZATION OF THE JOSEPH A. HOLMES SAFETY ASSOCIATION COMPLETED

Van H. Manning is First President of National Organization Which Will Conduct Campaign to Stimulate Safeguarding of Life in Mining Operations— Dr. David T. Day is Appointed Secretary

Organization of the Joseph A. Holmes Safety Association has been completed. Meetings were held March 4 and March 16, at which an executive council was selected, a secretary and treasurer appointed and committees named.

Dr. David T. Day was elected secretary of the association.

It was decided that the Bureau of Mines and the Smithsonian Institution should be included in the list of organizations composing the Association. It was agreed that the Director of the Bureau of Mines and the Secretary of the Smithsonian Institution should be president and vice-president, respectively, of the Executive Council, so that these offices might always be filled by residents of Washington, where the headquarters of the Association are to be located permanently.

Some suggestions were made that the safety appliance department of the Interstate Commerce Commission and other activities which are doing remarkable safety work, should be included. Mr. Manning, however, thought it would be best to confine the activities of the Association to the mineral industry. This includes mining, quarrying, metallurgical and some other activities dealing with minerals.

On an amendment offered by George Otis Smith, Director of the Geological Survey, it was determined to have the Executive Council composed of a president, two vice-presidents, two members at large, a secretary and treasurer. The Executive Council was empowered to select persons to fill the office of secretary and treasurer, and it was considered best that the secretary, at least, should be a salaried official.

Another suggestion by Mr. Smith was that the American Federation of Labor be represented on the Executive Committee by its president.

Hennen Jennings, the representative of the American Institute of Mining Engineers, was selected as one of the members-at-large. At the suggestion of Dr. Cottrell, of the Bureau of Mines, John Brashear, of Pittsburgh, was selected as the other member-at-large.

Mr. Manning, in assuming the office as first president of the J. A. Holmes Safety Association, said:

"In assuming the office as first president of this association I want to say that I fully appreciate the honor you have conferred upon me. It is a task, but one that I will perform with all the power and force that I can give. I think if Dr. Holmes could look down from his picture on the wall and see you gentlemen perpetuating the idea he wished most to foster, he would appreciate fully what is being done.

"This meeting appeals to me. It perpetuates the memory of Dr. Holmes and encourages safety-first ideas in mining and its allied industries. It brings together, once a year, the type of men he always endeavored to get together to assist him in the work in which he was engaged."

The executive council was authorized to draft resolutions and by-laws to be presented at the next meeting of the association, which is to be held at the Bureau of Mines, March 1, 1917.

In discussing the matter of raising the necessary funds, Mr. Manning suggested that 2,000,000 people could be reached through the medium of the technical press. He also suggested that the MINING CONGRESS JOURNAL could be of very great assistance in giving publicity to a matter of this kind which it is desired to get before the mining men of the nation especially.

The purposes of the Association are set forth as follows:

That annually there be awarded one or more medals with honorariums, which would be known as "The Holmes Award" for the encouragement of those originating, developing and installing the most efficient safety-first devices, appliances or methods in the mineral industry during the previous year; these awards to be the result of reports and investigations made by the secretary and the representatives of the Association.

2. From time to time the association shall also make suitable awards for personal heroism or distinguished service or the saving of life in any branch of the mining, quarrying, metallurgical and mineral industries.

3. Once a year a meeting of the association shall be held in the city of Washington at which all awards will be publicly announced.

BANK TO HANDLE FUNDS

With regard to the appointment of a treasurer, the executive council, on a motion by Mr. Walcott, designated the Washington Loan & Trust Company as fiscal advisors of the association with the understanding that the trust company would accept the services gratuitously, or if the bank would not look after this work free, the president was authorized to enter into negotiations with it with the idea of having it look after the business affairs of the association.

Dr. F. G. Cottrell was elected as chairman of the committee to draw up a constitution and by-laws. A. E. Holder, of the Department of Labor, and David White, Chief Geologist of the Geological Survey, are the other members selected for this committee.

Dr. Day was elected honorary secretary of the association on motion of Mr. Manning. The secretary is authorized to select such clerical assistants as made necessary by his work with the approval of the chairman.

The members of the executive council urged J. F. Callbreath, Secretary of the American Mining Congress, to accept the appointment as secretary of the Joseph A. Holmes Safety Association. Despite his interest in this work, Mr. Callbreath was forced to decline the invitation, as the constantly increasing responsibilities of the American Mining Congress are such as to require all of his time.

Those who attended the meeting March 4 were:

Hennen Jennings, American Institute of Mining Engineers; Dr. David T. Day, American Mining Congress; A. E. Holder, American Federation of Labor; Dr. Geo. Otis Smith, Mining and Metallurgical Society; Gen. W. H. Bixby, American Society of Mechanical Engineers; John H. Finney, American Institute of Electrical Engineers; Dr. F. G. Cottrell, American Electro-Chemical Society; Dr. L. O. Howard, American Assn. for Advancement of Science; S. S. Voorhees, American Chemical Society; Dr. Joseph Hyde Pratt, Geological Society of America; Dr. David White, National Academy of Sciences; Maj. Robt. U. Patterson, American Red Cross Society; Jos. D. Cannon, Western Federation of Miners; J. W. Paul, Mine Inspectors Institute; Prof. O. P. Hood (vice Prof. Wadsworth), Society for the Promotion of Engineering Education; Van H. Manning, director of the Bureau of Mines, and Geo. S. Rice, chief mining engineer, Bureau of Mines.

HENRY MACE PAYNE THINKS JOURNAL FILLS A NEED

Henry Mace Payne, a prominent New York consulting mining engineer, is interested in THE MINING CONGRESS JOURNAL. In a recent letter he says:

"Upon my return, after more than a year in the Klondyke and Siberia, I find the current copy of THE MINING CONGRESS JOURNAL. This little booklet has interested me extremely, and seems to fill completely a neglected field.

"If it is possible for me to secure, for my files, a complete set of the back numbers, I wish you would forward them to me, with the bill for them.

"Having been, as you know, an ardent advocate of the work of the American Mining Congress since its earlier days when we were all fighting for a Bureau of Mines, it is a pleasure to come back to this country and note the great progress which has been made and which, I am confident, is largely due to the indefatigable energy of Mr. Scholz and the untiring efforts of Mr. Callbreath.

"As a former secretary of one of the engineering societies, no one can appreciate better than myself, the innumerable little duties which you are called upon to perform, and which, although not recognized by the membership at large, go to make up the major portion of your actual work."

NEVADA MINING CAMPS MAPPED BY GOVERNMENT

Topographical maps have just been issued by the United States Geological Survey of the Ely and Manhattan quadrangles of Nevada. These are important mineralized areas and the maps will be of great assistance to geologists, engineers, miners and prospectors in these regions.

INCREASING IMPORTANCE OF MOLYBDENUM ORES LEADS TO SPECIAL REPORT

In Addition to Foreign Demand Permanent Domestic Market for This Metal is Expected to Develop —Ores Occur Over Wide Areas in West— They Are Mined and Concentrated Cheaply

Due to the widespread and increasing interest in molybdenum in Arizona, California, Colorado, Montana, Utah and Washington, it is expected that the following paper will attract wide attention. It is the last word with regard to molybdenum and its ores, their occurrence, production, concentration, market, prices and uses. The report is written by F. W. Horton of the Division of Mining and Technology of the Bureau of Mines, of which Dr. C. L. Parsons is the division chief.

Mr. Horton's report follows:

The extraordinary demand and the high prices being paid for tungsten and the increasing scarcity of tungsten ores, warrant more attention being paid its sister metal, molybdenum, which in a general way produces the same effects in steel as tungsten, but has the advantage that less than one-half as much need be used.

This country, and particularly the States of Arizona, California, Colorado, Montana, Utah and Washington contain many deposits of molybdenum ore. Further, molybdenum is probably of more common occurrence in nature than tungsten, its ores can be mined and concentrated cheaply, and the concentrates converted into metallic molybdenum or ferro-molybdenum as readily as tungsten concentrates can be smelted. Up to the present time, the market for molybdenum has been largely abroad, the use of the element in steel being much more popular in Europe than in this country, but there is no apparent reason why the domestic market should not develop considerably as the use of molybdenum becomes better understood.

ECONOMIC MOLYBDENUM MINERALS

Only two molybdenum minerals, molybdenite and wulfenite, are common enough to form molybdenum ores.

MOLYBDENITE

Description: Molybdenite, the disulphide of molybdenum (MoS_2), contains 59.95 per cent molybdenum and 40.05 per cent sulphur. It is opaque, lead-gray, and has a metallic luster and a greasy feel. It is so soft (hardness 1 to 1.5) that it soils the fingers readily and leaves a bluish-gray trace on paper. On porcelain its streak is slightly greenish. The specific gravity ranges from 4.7 to 4.8. Molybdenite commonly occurs in flakes or scales, resembling those of some micas in the way they may be split into thin leaves. Finely granular and massive forms are also common. Molybdenite crystallizes in hexagonal form, the crystals being tabular, or short and slightly tapering prisms.

Molybdenite is often confused with graphite, but may be easily distinguished because graphite is much lighter (specific gravity, 2.09 to 2.23). Heating a fragment of the mineral in an open tube will conclusively settle any question as to its identity, for molybdenite gives strong sulphurous fumes, whereas graphite gives none.

Molybdenite on weathering commonly forms molybdite, a hydrous ferric molybdate ($Fe_2O_3 \cdot 3MoO_3 \cdot 7\frac{1}{2} H_2O$) that theoretically contain 39.63 per cent molybdenum. In color, molybdite is lemon-yellow to pale yellow and occurs as an earthy powder, incrustations, fibrous masses, or capillary crystals in radiating groups. For many years molybdite was thought to agree in composition with the artificial molybdic trioxide obtained by oxidizing molybdenite, and most of the present text books on mineralogy persist in this error, giving its composition as MoO_3. Iron, however, is an essential part of the mineral. Molybdite by its color often calls attention to deposits of molybdenite which otherwise might be unnoticed.

Tests: Heated in an open tube molybdenite gives off suphurous fumes and a pale yellow crystalline sublimate of molybdenum trioxide (MoO_3) is formed. Before the blowpipe, the molybdenite is infusible but imparts a yellowish-green color to the flame. On charcoal in the oxidizing flame, pulverized molybdenite gives a strong odor of sulphur deoxide and the charcoal is coated with crystals of molybdic acid which appear yellow when hot and white when cold. Near the assay the coating is copper-red, and if the white coating be touched with an intermittent reducing flame, it assumes a beautiful azure-blue color. Molybdenite is decomposed by nitric acid, leaving a white or grayish residue (molybdic oxide).

Occurrence and Accompanying Minerals: Probably three-fourths of the reported occurrences and practically all of the commercial deposits of molybdenite so far discovered are in acid ingneous rocks such as granites, pegmatites, and syenites, the mineral being notably at home in rocks of this type.

Outside of the gangue-forming minerals such as quartz, feldspar mica, garnet, calcite, etc., the minerals with which molybdenite is most frequently associated are molybdite (its alteration product), pyrite, pyrrhotite, chalcopyrite, malachite, and chrysocolla. Other accompanying minerals are native copper, cuprite, chalcocite, bornite, tetrahedrite, azurite, galena, sphalerite, arsenopyrite, magnetite, limonite, wolframite, hübnerite, scheelite, cassiterite and bismuthenite.

WULFENITE

Description: Wulfenite is a molybdate of lead ($PbMo_4$) and theoretically contains 26.15 per cent molybdenum and 56.42 per cent lead. It is heavy and brittle, subtransparent to sub-translucent, and has a resinous or admantine luster, and generally a wax or orange yellow color. It may, however, be green, gray, brown, nearly colorless, or orange to bright red. The streak is white. The hardness is 2.75 to 3, and the specific gravity is 6.7 to 7. Wulfenite crystallizes in the tetragonal system, the crystals commonly being square and tabular, and sometimes extremely thin. The mineral generally occurs in well crystallized forms, but also in coarse or fine-grained masses.

Tests: Before the blowpipe wulfenite decrepitates and fuses below 2. With borax in the oxidizing flame it gives a colorless glass, which in the reducing flame becomes an opaque black or dirty green, with black flecks. With salt of phosphorus, in the oxidizing flame it gives a yellowish green glass which becomes dark green in the reducing flame. Heated with soda on charcoal the powdered mineral yields metallic lead. On evaporation in hydrochloric acid it decomposes, forming lead chloride and molybdic oxide. Moistening the residue with water and adding metallic zinc gives an intense blue color which persists after dilution.

Occurrence in Accompanying Minerals: Deposits of wulfenite are almost wholly in veins where it is associated with other lead minerals such as galena, cerussite, pyromorphite, vanadite, anglesite and descloizite. Gold and silver minerals also occur with it, and native gold is sometimes contained directly in the wulfenite crystals.

PROPERTIES AND USES

Physical Properties of Molybdenum: Pure molybdenum is a white metal, which is malleable, ductile and soft enough to be filed and polished with ease. However, it is seldom produced in the pure state, and its appearance depends largely upon the method of production. Reduction of the oxides or sulphides of molybdenum with hydrogen yields molybdenum as a gray powder which under heat and pressure may be compacted into a metallic bar that is brittle and even fragile. Molybdenum produced by alumino-thermic methods or by reduction in the electric furnace is a compact metal, but that produced in the electric furnace contains carbon and its physical properties differ from those of the carbon-free metal. The melting point of molybdenum is still in question. The U. S. Bureau of Standards has placed it at about 2,500° C. or 4,500° F. This is about 1,400° C. above the melting point of copper and 740° C. above that of platinum. Osmium, tantalum and tungsten are the only three metals listed by the Bureau of Standards as having higher melting points. The specific gravity of molybdenum is increased appreciably by drawing or hammering the metal, as is that of many other metals, such as copper and tungsten. The research laboratory of the General Electric Co. has determined the specific gravity of ductile molybdenum before drawing as 10.02, whereas after drawing it ranges from 10.04 to 10.32. Molybdenum wire has a tensile strength aproximately one-half that of hard-drawn steel piano wire or tungsten wire of corresponding size, and this tensile strength increases very appreciably with the fineness of the wire. In other words, the more the metal is worked the stronger it becomes. The electrical resistance of ductile molybdenum is 5.6 michromes per cubic centimeter of hard-drawn wire, and 4.8 for annealed wire, the resistivity being measured at 25° C.

Metallic molybdenum containing carbon is gray and brittle; it is also very hard and scratches steel and quartz, and even the hardest file will not cut molybdenum alloyed with a certain proportion of carbon. The melting point of the gray metal is much lower than that of the pure molybdenum, and its specific gravity is also lower, ranging from 8.6 to 8.9, according to the amount of carbon present. Pure molybdenum, surrounded with carbon and heated to about 1,500° C., absorbs carbon and becomes hard; conversely, carbon-bearing molybdenum melted with molybdenum dioxide is refined by the oxidation of the carbon in the metal.

USES AND PRODUCTION

The Uses of Molybdenum: The principal use of molybdenum is in the manufacture of special steels to which, particularly in conjunction with chromium, manganese, nickel, cobault, tungsten and vanadium, it imparts many desirable properties. These steels are used for a large variety of purposes, such as for crank and shaft forgings, high-pressure boiler plate, ordnance, armor-plate, armor-piercing projectiles, permanent magnets, wire, and self-hardening and high-speed machine tools. In a general way, molybdenum acts like tungsten in steel, but it is more active, and less is needed to produce a given result. Absolute figures as to the relative effect of the two elements cannot be given, as the effects are not exactly similar. The effective ratio of molybdenum to tungsten seems to be between 1 to 2 and 1 to 3.

Metallic molybdenum is used in various electrical contact making and breaking devices, X-ray tubes, and voltage rectifiers, and

in the form of wire for filament supports in incandescent electric lamps, for winding electric resistance furnaces, and in dentistry. Molybdenum is also employed in the manufacture of chemical reagents, dyes, glazes, disinfectants, etc.

Production of Molybdenum Ores: Queensland, New South Wales and Norway have to date, furnished the most of the world's production of molybdenum, the output from all other countries, including the United States, probably not amounting to 10 per cent of the total. Austria, Canada, France, Germany, Great Britain, Japan, Mexico, Natal, Russia, Sweden, and Australian states other than those mentioned, have at times made a small production of molybdenum ore, but the output has been too small to be worth consideration.

The first official record of the production of molybdenite in Queensland was in 1900, when the output amounted to 12.3 short tons of high-grade material. In 1914 the output was 87.1 short tons, valued at $185,830. The total production to the end of 1914 was approximately 1,030 short tons value at about $760,000.

A production of molybdenite in New South Wales was first reported in 1902. In that year the output was 16.8 short tons, and the total production to the end of 1914 was 498 short tons, valued at $264,000.

In Norway the production of high-grade molybdenum concentrates has averaged about 30 tons per annum since 1902. The principal molybdenite producing districts are in the provinces of Lister and Mandal, and Nedenais in the extreme southern end of the peninsula.

United States: The largest production of molybdenum ore in the United States was in 1903, when 795 short tons of wulfenite and molybdenite concentrates, valued at $60,865, were marketed[1]. Probably 750 tons or more of this material were wulfenite concentrates obtained by sluicing old tailing piles at Mammoth, Ariz. The remainder consisted of molybdenite concentrates, probably derived from the Crown Point Mine, Chelan County, Wash., with perhaps a ton or two from the mine of the American Molybednum Co. at Cooper, Me., and from other sources. Previous to 1903, practically the entire output of molybdenum ore consisted of 20 to 30 tons of high-grade material from the Crown Point Mine. From 1903 to 1914 the production of a marketable molybdenum product has been recorded in only three years, 1905 to 1907, inclusive, and the output was confined to small lots of molybdenite derived largely from the Crown Point Mine and from a deposit near Homestake, Mont., and to a few tons of wulfenite concentrates from Arizona. The production in 1914 consisted principally of a small tonnage of wulfenite concentrates obtaned from an experimental mill erected to retreat the tailings at Mammoth, Ariz., already referred to. Small lots of molybdenite from the Crown Point Mine and from a mine near Porvenir, N. M., were also marketed in 1914.

The production of both molybdenite and wulfenite increased notably in 1915. Shipments of or were made in January, 1915, from a molybdenite prospect on Red Mountain, near Empire, Colo., and are understood to have continued at the rate of 50 or 75 tons per week of material containing from 2 to 4 per cent MoS_2, until the mine was shut down for the winter.

A firm in Denver, Colo., which purchased small quantities of molybdenite ore for concentration, is said to have marketed about 15 tons of product containing approximately 75 per cent MoS_2. It is reported that another company in Denver, Colo., contracted to concentrate 500 tons of low-grade molybdenite ore from a deposit on Bartlet Mountain, Summit County, Colo., and that several hundred tons of low-grade ore from neighboring claims were concentrated by flotation, with fair results, at Leadville, Colo. A considerable tonnage of low-grade molybdenite ore was mined by the Leviathan Mines Corporation near Copperville, Mohave Co., Ariz. Other molybdenite prospects throughout the west produced small quantities of ore, and in a few instances small lots of high-grade molybdenite prospects throughout the West mining, followed by hand picking. The production of wulfenite also increased. The small mill at Mammoth, Ariz., was enlarged to over twice its former capacity, and during the summer produced wulfenite concentrates, containing about 22 per cent MoO_3 at the rate of 2 tons per day. Considerable development work was done on the Old Yuma Mine near Tucson, Ariz., and a small mill was erected for concentrating the wulfenite ore. A small production of wulfenite is also said to have been derived from a deposit about 30 miles west of Cutter, N. M.

Although no official figures of production are available, it is believed that the output of molybdenum contained in the molybdenite and wulfenite ores mined in the United States in 1915 will compare favorably with that of any other country. Whether the production will continue to increase in the future depends entirely upon the demand.

Canada: Canada has many promising deposits of molybdenite ore, but to date the production has been largely confined to small lots of high-grade material obtained by cobbing and hand-picking ore from rich streaks in certain deposits in the provinces of Ontario and British Columbia. These lots, usually from 500 to 2,000 pounds in weight, have been largely sold to chemical manufacturers in the United States, although a few have been shipped to England. In addition, perhaps 100 to 200 tons of medium-grade molybdenite ore have been shipped to the United States or England for concentration.

(Continued on page 200)

[1]Pratt, Joseph Hyde, Steel Hardening Metals, Mineral Resources, U. S. G. S., 1903, page 308.

TRADE COMMISSION TO AID UNIFORM ACCOUNTING MOVE

Aid in obtaining a uniform system of accounting for coal mines has been promised by the Federal Trade Commission. The matter was discussed at length by Samuel A. Taylor, chairman of the Uniform Mines Reports Committee of the American Mining Congress, and James F. Callbreath, secretary of the American Mining Congress, with Edward N. Hurley, of the Commission. The following committee report has been submitted by Mr. Taylor:

"Mr. Callbreath and myself called on Vice-Chairman Hurley, of the Federal Trade Commission in Washington, relative to a uniform system of accounting for coal mines. We did not meet with much success so far as getting the Commission to undertake this work, but we did meet with this definite suggestion, after discussing the matter at some length with Mr. Hurley, namely, Mr. Hurley suggested that we go back to our associations of operators in the various districts, and have them undertake to work out a uniform system of accounting for coal mines, and the Commission would render any assistance it could in the way of helping to get them put into use.

"It, therefore, resolves itself into this, that in each separate association of operators, we should endeavor to have a committee of the best accountants get up a form of accounting as complete and concise as possible, and then try and arrange a joint conference of representatives of the different associations to work out, if possible, a common system from those suggested.

"This can be done very satisfactorily, if we can get the cooperation of the coal operators in the different sections of the country. In fact, if we can get two or three associations to work on this, and have them agree on a uniform system, I believe the others probably will follow and endeavor to have such a system put into practice.

"Mr. Callbreath is bringing the matter to the attention of the different departments in Washington who may appoint men who will get together and agree upon a uniform report for these different departments. If we can accomplish this in the national government I think it probably will not be such a difficult task for the operators in the different states to have their respective state departments adopt reports similar to those of the national government."

Sell Maps for Five Cents

In order to place within the reach of every school child in the United States an excellently executed map, the Geological Survey is preparing maps of the individual states which will sell for five cents each. They are photo-lithographed reproductions of the maps being used in the compilation of an international map of the world.

METHANE QUADRUPLES WHEN FAN IS SLOWED DOWN

H. I. Smith, of the Bureau of Mines, is cooperating with the State mine inspection department of Indiana in determining the rate of accumulation of methane at the working face in a mine where it has been the practice to slow down the fan at shot firing, a practice followed at a number of the mines in Indiana. The results of the tests showed that the methane content rose from 0.27 to 1.02 per cent during the 40 minutes that the air was shut off from this part of the mine, or, in other words, increased almost fourfold.

U. S. IMPORTS STRONTIUM; NEGLECTS DEPOSITS HERE

Despite the presence of promising deposits of strontium in northwestern Ohio and southeastern Michigan, no ore of this character is mined in the United States. There are also deposits in Colorado and Arizona.

This ore is imported to the extent of 3,000 tons per year from England and Sicily, and is used in making red fire for fireworks and night signals.

In Europe strontium hydrate is used in sugar refining. It is held to be much more efficient than the lime process used in this country.

Install Electric Cap Lamps

H. I. Smith, of the Bureau of Mines, assisted the Vandalia Coal Co. in making the first installation of electric cap lamps in the State of Indiana. Analyses of the return air on one of the haulage ways where open lights were used showed a methane content of as much as 0.82 per cent, which is exceptionally high for the return air of a traveling way in an American bituminous coal mine where open lights are used.

FIRST-AID WORK IN MINES TO BE STANDARDIZED

While standardizing accident figures, mining regulations and other matters coming under its jurisdiction, the Bureau of Mines is not overlooking the standardization of the first-aid treatment.

Three consulting mining surgeons on the Bureau of Mines' staff recently conferred with other experts in first-aid treatment, and drew up standard regulations which soon will be published by the Bureau.

Dr. M. J. Shield, of the American Red Cross, also was a party to the conference, and approved the standard methods which soon will be in force among all Bureau of Mines' first-aid men. An effort will be made to have them adopted by all the first-aid teams.

GEOLOGICAL SURVEY AND BUREAU OF MINES ASSETS IN CASE OF WAR

Modern Warfare Calls For Large Number of Specialists Who Can be Furnished by These Two Bureaus—Even Minor Officers in Army Now Furnished With Topographic Maps—Mining Engineers, Geologists and Chemists in Much Demand

It is doubtful if even the War Department itself has an accurate conception of the service which could be rendered the country in case of war by the engineers connected with the Geological Survey and Bureau of Mines. Attaches of these bureaus could be used to great advantage if extensive military operations should become necessary. In the Geological Survey there are more than 400 professional men. In the Bureau of Mines are a number of engineers and other experts in addition to its large corps of trained first-aid men, both in the Bureau itself and among the affiliated organizations.

Most of the professional men in the Geological Survey have had many years of field service. They include topographers, hydrographers, geologists and chemists. The Survey is the one branch of the government service having an organized corps of topographical engineers. In the topographical division of the survey there are nearly 200 men who are expert map makers, all of whom are accustomed to field conditions. They are ready for service at practically an hour's notice and could be used in reconnaissance and detailed surveys, which are invaluable in military maneuvers.

SANITARY ENGINEERS

There are seventy-five hydrographers. Many of these have had special experience in sanitary engineering. There are twelve men on the Survey staff who have made a specialty of water supply. Most of the geologists have a considerable technical knowledge of mining, underground surveying and excavation. Since modern warfare has made necessary such extensive excavations the geology of the country selected for a line of trenches would have an important bearing on the success of the operations. As the "digging-in" methods, so necessary in warfare, today also carry with it extensive tunneling operations, with the idea of exploding mines under enemy trenches, the need for geologists and mining engineers is very much greater than ever before has been the case.

Germany, as well as the other countries engaged in the present war, is making good use of her geologists and chemists. It is believed that the United States is better equipped with experts along this line than is any other country, and it has been suggested to the War Department that all data relating to the possible service that such men could render, should be gotten together. Other advantages are that men in the government service have their records on file. Their reliability and particular adaptability are well understood. No time would need be lost in investigating the trustworthiness or particular qualifications of the man selected.

MAPS A NECESSITY

In time of war, especially under present conditions, no arm of the service is more important than the corps which makes topographical maps. The German army is furnishing topographical maps to even subordinate officers.

In addition to the topographical engineers on the survey staff there are many assistant topographers who could be of equal service.

There are, too, a large number of men who have been trained in the Geological Survey, but who have entered into private employment or have undertaken the private practice of their profession. Many of these men would be available and through the Geological Survey could be reached almost as quickly as men in actual service.

The Geological Survey has more data on the geography of North America than any other institution in the country. It has mapped the larger portion of the United States, but even where topographical maps have not been prepared, sufficient data exists in the files of the Survey to make very accurate maps of the region. What is very important is that this data be available at a moment's notice. The Survey is equipped to furnish a large map order promptly. When the battleship fleet unexpectedly was ordered to make a world cruise, it was necessary to prepare in two weeks' time a large number of foreign charts. Telegraphic inquiries were sent broadcast, but no private firm was in position to handle the order in the short time that was at the disposal of the Navy Department. It was necessary to fall back on the Geological Survey and the entire order for maps and charts was prepared in less time than was stated in the exacting requirement. Geologists and engineers in the service of the Survey are engaged in a work which requires a very intimate knowledge of many parts of the

country. While collecting their technical data they, naturally, become familiar with trails, conditions of the roads, resources and know something of the general characteristics of the region and it is probable that there is no area in the United States or Alaska that is not known to some member of the Geological Survey. They would be able to indicate something as to the amount of supplies the district could furnish and what the prospects would be for handling heavy transportation. In fact some army men are of the opinion that no strategic operations should be taken without consulting with government men in the Geological Survey.

KNOW GOVERNMENT METHODS

These men are familiar with government methods of accounting and know the details of the manner in which government business is done. Some could be used effectively prehaps in the quartermaster's department. Men who have been party chiefs in survey work should be well fitted to handle men and look after transportation and supplies.

It also is a fact that a large percentage of the engineers connected with the Survey are familiar with foreign countries, and would be able to give considerable expert information that might not be obtained so readily otherwise. There are a number who are familiar with one or more foreign languages and doubtless would be of service in this regard. For instance at least one member of the Geological Survey's present staff is familiar with the area through which the punitive expedition into Mexico has passed. He not only speaks Spanish, but is familiar with the geography and water resources of the country and has a good idea of the source of supplies.

"Packing" horses is almost a lost art in this country, but there has been no chance for a large percentage of the Survey's men to have become unfamiliar with this operation, which is so necessary in military movements. A considerable number of these men are expert rifle shots and some few of them have had the advantage of military training.

Names, official designations and salaries of employes of the U. S. Geological Survey who resigned their positions between August 1, 1914, and March 20, 1916, are as follows:

David T. Day, Geologist, $3,600; Max A. Pishel, Associate Geologist, $1,800; Robt. H. Randall, Junr. Topographer, $780; Edgar C. Bain, Junr. Chemist, $1,200; Chas. T. Kirk, Junr. Geologist, $1,080; Calvin S. DeGolyer, Junr. Engineer, $1,320; Clarence D. Parker, Junr. Chemist, $1,200; Carl D. Smith, Asso. Geologist, $2,160; Will R. Chenoweth, Junr. Topographer, $1,080; Howard Kimble, Asst. Engineer, $1,620; James R. Ellis, Topographer, $1,800; John L. Lewis, Asst. Topographer, $1,500; Edw. W. Parker, Coal Specialist, $4,000; Frank B. Storey, Junr. Engineer, $1,380; Calvin T. Moore, Junr. Topographer, $900; James H. Hance, Asso. Geologist, $1,620; Edwin S. Fuller, Asst. Engineer, $1,920; Victor H. Barnett, Geologic Aid, $720; Walton VanWinkle, Asst. Chemist, $1,800; Howard T. Critchlow, Junr. Engineer, $1,200; Waldemar Lindgren, Geologist, $5,000; Elmer A. Porter, Asst. Engineer, $1,920; Glen M. Ruby, Junr. Topographer, $780; Heath M. Robinson, Geologic Aid, $1,080; Leon V. Fees, Junr. Topographer, $900; Lynn Crandall, Asst. Engineer, $1,620; Laurence R. Ebert, Asst. Topographer, $1,200; George W. Lucas. Junr. Topographer, $960; Frank B. King, Asst. Engineer, $5 per diem, W. A. E.; Alex. Deussen, Asst. Geologist, $6 per diem, W. A. E.

As is the case with the Bureau of Mines, some of the persons mentioned above left the service for reasons which in no way can be chargeable to the war.

An indication of the inroads which have been made in the staff of the Bureau of Mines since the opening of the war in Europe is shown by the actual list of resignations. These technical men have been induced, by the very much higher salaries offered, to accept work with the various private institutions developing industries which require special training and experience.

The Bureau of Mines requires the services of 300 technical men on its staff. The salaries are not on a parity with those paid by commercial companies. In most cases these men have been able to more than double their salaries in making the change. Those who have left the service since August, 1914, together with their rank and salary paid them by the Bureau of Mines, are as follows:

Louis A. Scholl, Jr., Junior Chemist, $1,320; David J. Price, Foreman Miner, $1,800; Archie J. Strans, Junior Mining Engineer, $1,500; Victor B. Bonney, Junior Chemist, $1,200; Austin A. Flynn, Foreman Miner, $1,500; Amos H. Bannister, First Aid Miner, $1,200; John T. More, First Aid Miner, $1,200; Robert Back, Junior Ceramic Chemist, $1,380; Herbert M. Wilson, Engineer in Charge, $4,300; Christian G. Storm, Explosives Chemist, $2,700; Elton W. Miller, Assistant Engineer, $1,620; Max M. Shaw, Junior Fuel Engineer, $1,200; Joseph P. Bader, Junior Chemist, $1,200; Oliver W. Storey, Chemist, $2,700; J. Herbert Hunter, Junior Explosives Chemist, $1,500; Louis F. Clark, Junior Mining Engineer, $1,200; George C. Cook, Assistant Fuel Engineer, $1,620; Carl A. Taylor, Junior Explosives Chemist, $1,500; Alfred G. Heggem, Petroleum Engineer, $3,300; John C. White, Laboratory Aid, $720; Dr. James N. Lawrence, Assistant Physical Chemist, $1,500; Archie L. Hyde, Assistant Chemist, $2,160; Arthur I. Young, First Aid Miner, $1,380; James C. Roberts, Mining Engineer, $3,300; Dr. Horace C. Porter, Chemical Engineer, $3,120; George E. McElroy, Junior Mining Engineer, $1,320; Thomas C. Atterbury, Junior Explosives Engineer, $1,320; Isaac Zortman, Junior Full Chemist, $1,020;

Irving C. Allen, Chemist, $3,120; James M. Lohr, Assistant Alloy Chemist, $1,680; George G. Oberfell, Junior Chemist, $1,320; Charles Enzian, Coal Mining Engineer, $3,600; Harrison D. Mason, Jr., Assistant Mining Engineer, $1,980; Albert S. Crossfield, Junior Explosives Chemist, $1,380; John H. East, Jr., Junior Metal Mining Engineer, $1,320; J. W. Paul, Mining Engineer in charge of rescue work, $4,00; Ira Sproat, Junior Chemist, $1,500; C. B. Dutton, Law Examiner, $2,400; Arthur L. Smith, Junior Chemist, $1,200; Robt. J. Hammon, Junior Chemist, $1,260; Jos. S. Cullen, Junior Chemist, $1,500.

PLACES HARD TO FILL

Many of these men are experts in specific lines, whose places cannot be filled by men who are able to carry on the work until they have first spent considerable time in familiarizing themselves with what has been done by their predecessors. The work of the Bureau of Mines particularly has been interfered with to a considerable extent by these separations. There is some talk of legislation which will necessitate government scientists to complete specific investigations before leaving the service. On the other hand this works considerable hardship on the men who, by such a law, might lose an opportunity to accept employment at much better salaries.

In the above list is the name of J. W. Paul, who was the Mining Engineer in charge of rescue work. His separation from the Bureau of Mines cannot be charged directly to the war. He received a salary from the Government of $4,000 per year. He left the service to undertake private practice and those familiar with his ability predict that his earning capacity will be considerably more than doubled from the very start.

DUTTON GETS BIG SALARY

C. B. Dutton, Law Examiner of the Bureau, is another man whose place will be hard to fill. He has accepted services with an American company which is developing the foreign interests of the Rittman process of oil refining at something like four times the salary he was receiving.

James C. Roberts, who was a mining engineer with the Bureau of Mines, has accepted the chair in safety engineering at the Colorado School of Mines. In this position Mr. Roberts will be able to do great service in extending the "Safety-First" movement, which owes its greatest stimulus to the Bureau of Mines.

There are perhaps a few more exceptions in the above list where separations are not due to the war. Even in normal times there is a considerable change of personnel on the part of government scientists owing to the willingness of private concerns to pay higher salaries.

The Bureau of Mines is making investigations along a number of lines which are of much advantage to the country in securing a greater degree of preparedness for national defense. The following activities of the Bureau would be very helpful in case it were necessary to take advantage of the nation's resources and be in position to secure war-time efficiency:

A general investigation has been made in the manufacture and use of alloy steels. This research is of the greatest value in the manufacture of armor plate and the other many uses to which steel is put in warfare.

WOULD TEST EXPLOSIVES

Investigations of explosives have developed many important facts. In case of war it is altogether probable that the Bureau of Mines would be called upon to test explosives furnished the government.

In the past tests of coal for naval use have been made under the Bureau of Mines' supervision. Other investigations as to the use of oils as fuel, both for steam boilers and internal combustion engines, contribute not a little to the efficiency in transportation and other uses.

Now that gas is being used on the battlefield there is considerable opportunity offered to those familiar with oxygen breathing apparatus. In fact, Bureau publications on this subject were requested directly from the firing lines and have been forwarded to a destination "somewhere in France" through the British Embassy.

READ IN THE TRENCHES

The French government has requested officially the publication of the Bureau of Mines on Mining Camp Sanitation. Many of the findings in this report are applicable to military as well as the mining camps. There have been numerous calls from the trenches of northern France for publications of the Bureau of Mines and the Geological Survey.

Some of the most intricate and detailed investigations of fuses have been made by the Bureau of Mines. Extensive and highly advanced work on the behavior of nitroglycerine when heated has been done.

Another branch of research, which could be utilized to great advantage during war, would be the Bureau's investigation as to the deterioration and spontaneous heating of coal in storage. Incidentally, it has been found that deterioration can be checked and heating can be prevented by storing coal under water. Whether or not this method of storage is advantageous when all things are considered is still a matter of doubt, and just now is being specially investigated by the Bureau.

MAGAZINES FOR EXPLOSIVES

The Bureau of Mines is also investigating magazines for explosives.

Among other things the Bureau has developed that a magazine of cement mortar is practically bullet proof. Bricks of compo-

sition similar to that of Mexican adobes also are very effective for magazine construction. Of course, such investigations as there are made for industrial purposes. There have been sufficient cases of disastrous explosions of magazines at mines to safeguard powder supplies in every possible way. Considerable necessity exists for having these magazines bullet proof as a number of explosions were caused by rifle shots into the magazines.

The Bureau has made various investigations as to how persons are best resuscitated from gases. Considerable work has been done in ascertaining the best devices for firing explosives from a distance.

There are many activities on this Bureau which have a direct bearing on efficiency, which would be utilized in time of war. For instance the amount of intelligence that is being concentrated in the Bureau of Mines for the use of heavy oils in internal combustion engines may result in the solving of this important problem, which, if successful, would be revolutionary in its effect on transportation methods.

BUREAU OF MINES PATENTS REMARKABLE GAS DETECTOR

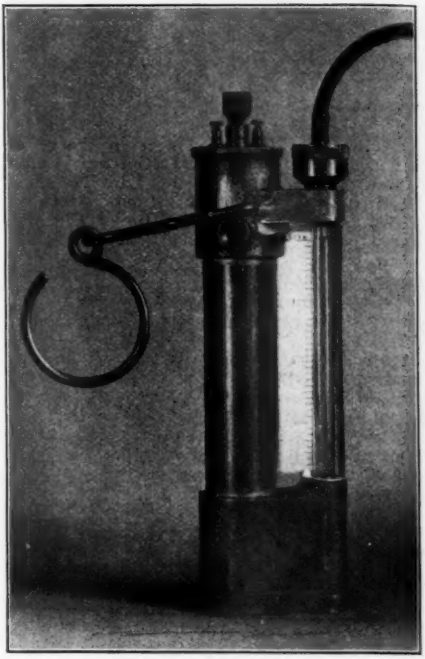
A new gas indicator for detecting explosive gases in mines and other places, invented by George A. Burrell, a chemist of the Bureau of mines, with offices at the Pittsburgh Experiment Station, has been granted a final patent.

Mining men for thirty or more years have been trying to develop a detector that would show accurately and quickly the percentage of explosive gas in mines. The Bureau of Mines' instrument, in addition to possessing these advantages, is durable in construction, light in weight, and simple enough in operation so that men without technical experience can operate it. It is accurate to 0.10 per cent.

BETTER THAN SAFETY LAMP

Compared to the safety lamp, the device at present used for detecting explosive gas in air, of which there are thousands in use in the United States, the Bureau of Mines' device is ten to twenty times more accurate, lighter in weight, stronger in construction, and possesses fewer parts.

The great need for such a device lies in the fact that fire-damp becomes explosive in mine air when as little as 5.5 per cent is present. A safety lamp, on the average, as used by different men, can not detect less than 2 per cent, so that air in a mine may contain a proportion of fire-damp close to the explosive point before it can be detected. In England, if certain parts of a coal mine contain a maximum of 2.25 per cent of fire-damp the mine is shut down, in accordance with the law, and the ventilation improved before the men are allowed to resume work in the mine.



METHANE INDICATOR

Invention by Bureau of Mines man, which is attracting much attention.

PARTICULARLY VALUABLE HERE

At present, in this country, mining laws are not so strict as regards ventilation, in part because of the difficulties in the way of making precise determinations of fire-damp. Now that an instrument has been devised with which this can be done in a very simple manner, much closer supervision can be placed over the air in coal mines and many disastrous explosions prevented.

Patents have just been granted on the Burrell detector. They were taken out by the Bureau of Mines and permission will be given to responsible manufacturers to manufacture the detectors. No charge will be made for the use of the patents but the privilege of manufacture will be given only when it is assured that the public will be given the advantages of the invention without charge beyond the ordinary charge for manufacture.

W. S. Robbins, of the U. S. Geological Survey, has returned from Panama where he directed the installation of the Interior Department's exhibit at the Panama National Exposition.

BIG TONNAGE OF COAL STILL TO BE TAKEN OUT IN ROSLYN FIELD

Despite Heavy Production During Many Years, Principal Field in Washington is by no Means Worked Out, Geological Survey Expert Finds—Better Transportation Facilities will Open Gold Mining District

Consideration of the production of coal in an area is important in connection with hydroelectric development not only because of limitation in warranted cost imposed by competition with steam power in localities favored by large beds of coal that can be mined cheaply, but also because the economical development of streams lacking storage reserviors makes necessary the installation of auxilliary steam plants to carry a portion of the demand for energy during periods of low water according to Edwin J. Saunders, of the United States Geological Survey.

Coal has been found in a number of localities in Kittis County, Washington, but only the Rosyln field in the Yakima basin is economically important, though coal is being shipped from a small mine in the Manatash formation along Taneum Creek about 10 miles west of Thorp.

The Roslyn bed, which is the principal one being worked in the Roslyn field, has given Yakima Valley first rank among the coal-producing sections of the State. The northern boundary of the bed has been accurately traced from Clealum to Jonesville, and the east and west limits are fairly well defined in the workings at Clealum and Jonesville, but the southern boundary is known only approximately. The average thickness of the bed over the whole field is 4 feet 3 inches. From the proven arear, the probable area, and the average thickness, an estimate has been made of the quantity of coal in the field and, with an estimate of future production, is shown in the *following table*. The estimate of future production was based on the percentage of coal mined in each part of the field in relation to the known coal of that section as shown by actual workings. A map on a scale of 400 feet to the inch, furnished by the Northwestern Improvement Co. and prepared about June, 1910, was used for this work. From all the information at hand it appears that about 70 per cent of the coal in the proved areas had been recovered up to that time. Improved methods of laying out workings will return a conservative estimate of 75 per cent for proved areas now beginning to be worked, and a conservative estimate indicates that 80 per cent of the reserve coal may be recovered. It is possible that this percentage may be exceeded in actual practice.

MINERALS OTHER THAN COAL

In the mountainous parts of the district considerable prospecting has been done for gold, copper, lead, iron, and cinnabar, deposits of which are known to exist. Placer mining has been practiced for years along Swauk Creek, and many prospects have been located and some development work has been done in the upper Clealum basin. Gold-bearing formations which have yielde very favorable prospects have been located at the head of American River, but development has been hampered by the high cost of transportation over roads and trails. Better transportation facilities will make mining prac-

ESTIMATES OF FUTURE PRODUCTION OF COAL FROM ROSLYN BED

	Area in acres	*Total original tonnage*[1]	*Recovery* *Per cent*	*Recovery* *Tons*
Probable area	2,221	16,524,240	80	13,218,202
Proved area unworked	4,153	30,898,320	75	23,173,740
Proved area worked	3,287	24,455,280	70	17,118,696
	9,661	71,877,840	..	53,510,638
Production reported by State mine inspectors, 1887–1911[2]	.....	.....	..	[2]19,455,947
Estimated future production				34,054,691

[1] 7,440 short tons per acre.

[2] This output is for the Roslyn bed alone. The output of all beds in Kittitas County is shown in the table on page 166.

ticable and open a local market for the water powers.

Hydraulic power developments in the Yakima basin are unimportant when compared with the total water power developed in the State of Washington. The rated capacity of power machinery installed or in course of construction in the State in 1913 has been estimated at approximately 400,000 horsepower. Of this amount about 190,000 horsepower may be credited to the section of the State west of the Cascade Range and about 170,000 horsepower to the Spokane River developments. Only about 14,000 horsepower, or 3.5 per cent of the total in the State, is developed in the Yakima Valley.

The following table shows the mine production for the years 1887 to 1912, inclusive, as reported by the United States Geological Survey. The total production of the Roslyn field has been about 30 per cent of the grand total for the State.

ANNUAL PRODUCTION OF COAL IN KITTITAS COUNTY, 1887 TO 1912

	Short tons		*Short tons*		*Short tons*
1887	104,782	1897	370,657	1907	1,524,887
1888	220,009	1898	566,396	1908	1,414,621
1889	294,701	1899	661,210	1909	1,550,539
1890	445,311	1900	873,751	1910	1,661,650
1891	348,018	1901	1,012,521	1911	1,256,745
1892	285,088	1902	1,250,920	1912	1,237,427
1893	253,467	1903	1,369,716		
1894	232,580	1904	1,340,400		21,526,331
1895	281,534	1905	1,280,845		
1896	265,953	1906	1,422,612		

The Big Dirty, a bed containing about 6 feet of good coal and lying about 200 feet above the Roslyn bed, is now being worked at Jonesville by the Roslyn Fuel Co. as mine No. 2.

The fields outside of Roslyn are not at present producing sufficient coal to enable steam to compete with water power. The extent of proved area, the total content of the coal-bearing beds, and the amount probably recoverable are indicated by the following table:

PROVED AREA, PROBABLE RECOVERY, AND TOTAL CONTENT OF COAL-BEARING BEDS IN KITTITAS COUNTY

Field	*Proved area Acres*	*Total original content Tons*	*Probably-recoverable Tons*
Roslyn	9,661	87,680	25,600
Lower Taneum	.....	768	60
Manastash	.....	5,372	300
	.....	93,820	25,960

TRANSPORTATION

Two transcontinental lines cross Yakima Valley and make it possible to ship the valley products to all parts of the world and to receive supplies not produced locally.

The Northern Pacific Railway—the main trunk line of the region—crosses the Columbia at Kennewick near the mouth of Yakima River and follows the river very closely almost to the source. A short branch line connects the main line at Clealum with the coal fields n the vicinity of Roslyn and Ronald. Another branch line joins the main line near Toppenish and extends into the Sunnyside district, with a terminal at Grandview. A third branch line is being constructed from Toppenish into the Yakima Indian Reservation. The total length of Northern Pacific lines in the Yakima basin is about 200 miles.

The Chicago, Milwaukee & St. Paul Railway crosses the eastern half of the drainage basin near Ellensburg and parallels the river to the source at Snoqualmie Pass. It was put into operation in 1910, but opened up very little territory that had not already been served by the Northern Pacific Railway. The total length of line in the basin is about 80 miles.

A branch line of the Oregon-Washington Railroad & Navigation Co. connects North Yakima with Walla Walla and other points in the southeastern part of the State. Surveys have been run by this company for a line extending up Neaches and American Rivers, across the Cascade divide and down White River to Puget Sound.

Two local companies are operating transportation lines in the vicinity of North Yakima. The North Yakima & Valley Railroad extends from North Yakima to Naches and Moxee, and a line is being constructed into the Cowiche Valley; and the Yakima Valley Transportation Co. operates an elec-

tric service into the Selah, Atanum, and Wide Hollow districts.

REPRESENTATIVE TAYLOR WANTS WEST TO STUDY FOSTER BILL

Representative Taylor, of Colorado, is very anxious to see an adequate number of the Foster bill distributed among the mining men in the country. This bill (H. R. 12275) proposes to amend and codify a section of the Revised Statutes of the United States relating to mining claims on the public domain. It is proposed as a substitute to the proposition providing for a special commission to study the revision of mining laws. With reference to this bill Mr. Taylor, who is the only man familiar with metal mining on the House Committee of Mines and Mining, says:

"The bill evidently was prepared by the Bureau of Mines and represents Judge Thompson's ideas along this line. Very little opportunity is being given to the mining men of the country to study the laws as are stated in this bill. It should be sent out broadcast to the mining industry all over the West. Every opportunity should be given for the careful study of this measure so that intelligent suggestions for amendments could be made and attention called to any omissions which should be covered by the proposed law. The bill undoubtedly will not be taken up until next winter.

"I am confident there are some good features in the bill. There are others that are unnecessary and some that are unwise. There are some provisions that may be positively injurious. Throughout twenty years of legislative service it has been my observation that no bill is ever ideal. It is necessary to pick out the grains of wheat from the chaff. I think we should give the country full opportunity to assist in selecting the grains of wheat.

"If regulations of individual mining camps are recognized by the federal statutes, it seems to me that some of the features of this bill should be open for acceptance or rejection by the individual states. If a state should want the "Apex" law, let it have it. Whether all the states wish to participate in all parts of the bill, could be determined by their legislatures before same specifying it, and in case no such notice was given the bill would go into effect. As it is there are so few copies of the bill available for distribution that comparatively few persons are having the opportunity to look over the proposed legislation."

Mr. Taylor is of the opinion that active interest on the part of the metal mining people of the country will result in suggestions and changes which may allow the passage of some sort of revision of legislation during the early part of 1917.

The most desirable action to take in regard to this bill would be for mining men, having any suggestions to make, to write to their Congressmen. The members of the committee probably will not have time to give any particular attention to a volume of private correspondence with regard to the bill. Congressmen from mining districts, however, are very much interested and will give the matter careful attention it is believed.

MUCH GOOD RESULTS FROM COOPERATION IN CALIFORNIA

Bureau of Mines officials are very much gratified at the results which are being obtained by the Bureau's cooperative arrangement with the California Industrial Accident Commission. Edwin Higgins, Bureau of Mines representative, who is in direct charge of this work, has reported that all arrangements are completed for two centralized mine-rescue stations which will be located at convenient points on the Mother Lode.

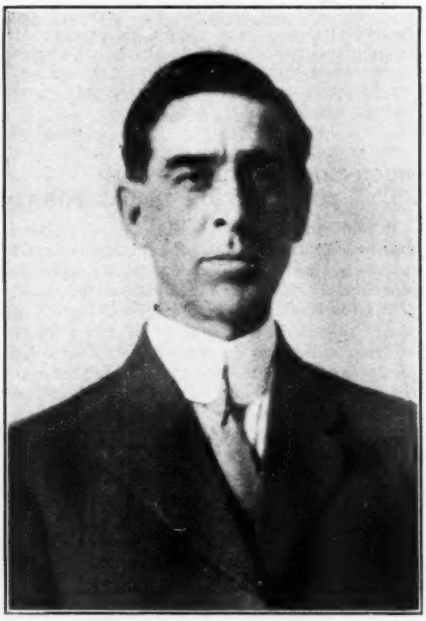
Investigations of the sanitary conditions of the mines in California are just beginning. This survey is aimed principally at tuberculosis and the hookworm. These are the two disease which are most prevelant among those who work underground in California. It is believed that it will be possible to reduce greatly occurrences of these diseases by certain simple sanitary measures.

Joseph White, the sanitary engineer of the Bureau of Mines, is looking after this work personally. While the campaign cannot be said to be fully under way, such preliminary work as has been done shows very gratifying results.

PENNSYLVANIA COMPANIES INCREASING THEIR INSURANCE

In the Pittsburgh district interest in safety methods in mines is greater than ever before, principally because the Pennsylvania compensation law went into effect January 1, many contend. Many companies are taking out insurance with the Associated Companies, the inspection department, which is in charge of H. M. Wilson, reports. The rating scheme of the Associated Companies penalizes coal companies for failure to have approved safety methods, but credits those companies using such methods by making their rates considerably less than the base rate. The companies, naturally are interested in adopting any practice which will result in the insurance rate being lowered. It is believed that safer operation of coal mines in this district will result and the rock-dust method of preventing coal-mine explosions will be adopted more widely.

GOVERNMENT EXPERTS WELL KNOWN TO MINE OPERATORS



FRANK L. HESS, GEOLOGIST

Frank L. Hess, who specializes on the rarer metals for the Geological Survey, and is a geologist in the organization, was born in Streater, a coal-mining town in Northern Central Illinois, and at that time one of the most important in the State, on September 4, 1871.

He was educated in the common and high schools of that town, and later moved to California, where he attended Stanford University, from which institution he graduated in mining and geology in 1903. While at the university he was assistant in the assay office for three years. During two years vacation periods he worked as field assistant in the Geological Survey, and upon graduation went to Alaska as geological aide and assistant geologist, where he worked in the gold regions of Nome, Fairbanks, Eagle, the Forty-Mile Country, Rampart, and in the tin-bearing region on Lost River, Buck Creek and Cape Prince of Wales (Tin City). After leaving the Alaskan work he specialized on the rarer metals, including tungsten, tantalum and tin. He has also studied various gold deposits and has published works on gypsum deposits of California, and magnesite deposits of California, articles upon graphite, rare earth metals and other mineral deposits in many parts of the United States and Mexico.

COAL OPERATORS ANSWER STATISTICAL QUERIES PROMPTLY

Coal operators are very much more prompt in making returns to the statistical queries, which are sent out by the government, than are those in charge of other industries.

C. E. Lesher, who has charge of the coal statistics of the U. S. Geological Survey, says the cordial cooperation from coal operators is the only thing which makes possible the early publication of coal statistics.

Inquiries made at the Bureau of Census, Agricultural Department and other government departments, indicate that mining men are much more prompt in making returns than are the various other classes of business men to whom such queries are sent.

The metal mine operators are just as prompt to make returns as are the coal operators, with the exception of those engaged in placer mining. With reference to returns made by coal operators Mr. Lesher says:

"Of 4,000 inquiries sent out January 1, more than 75 per cent of those addressed have replied. This particular set of questions covers 6,000 bituminous coal mines. This is not an unusually prompt response, but represents the general average.

"Of course, it is very much more difficult to get returns from the last 25 per cent. If this latter portion would answer as promptly as the majority, it would be possible to have final figures ready for the public two or three months earlier than is possible now.

"Coke operators have replied a little more promptly than the coal men. Eighty per cent of the queries sent coke operators have been answered.

"Large operators, as a rule, reply very much more promptly than do those conducting business on a smaller scale. The smaller operator, however, is becoming more alive to the fact that his returns are just as necessary to accurate totals, and improvement is being noted in the accuracy and promptness of replies."

When replies are not made to the Survey as to production, it makes it necessary for it to get this information indirectly. Considerable machinery is maintained to secure this information from those who do not make, or who refuse to furnish it. Rather than miss any return, a representative of the Survey is sent to the locality and the exact amount of production is ascertained. So thoroughly is this done that actual figures are obtained for more than 99 per cent of the production.

HAZARDS TO MEN INCREASE AS MINES BECOME LARGER AND EMPLOY MORE MEN

Van H. Manning, Director of the Bureau of Mines, Brings Out Interesting Facts in Address to Mine Operators and Mine Inspectors at Harrisburg, Pa.—Believes Number of Deaths and Injuries Can Be Reduced by Half

Further illuminating facts in regard to mining accidents and their prevention were brought out in a speech by Van H. Manning on March 24 at the meeting of Mine Operators and State Mine officials at Harrisburg, Pa. Extracts from Mr. Manning's speech follow:

In 1914, the last year for which statistics are available, there were approximately 383,000 persons employed in or about the mines and quarries in the State of Pennsylvania, and the total fatalities among these workers were 1,028. These figures do not include the men employed at coke ovens or at various ore dressing and smelting plants, except blast furnaces, that reported accidents. Although the death rate per 1,000 men employed in mines and quarries was commendably low, being but 2.68 as compared with 3.23 for the United States at large, none of you doubt, I am sure, that fatalities from accidents can be reduced decidedly. For instance, the death rate from accidents in and about the anthracite mines in 1914 was 3.31 per 1,000 men employed, a figure that can most certainly be reduced.

OVER 1,000 KILLED ANNUALLY

The death of over 1,000 men annually in this State, and the serious injury of at least 5,000 more through causes that in part, at least, are preventable beyond doubt, are matters that deserve your serious attention. As a representative of the Federal Government, I am glad of this opportunity to contribute to the proceedings of this conference and to meet others who are engaged in a work that must appeal to everyone, the conserving of the lives of our countrymen.

It is not possible for me in the time at my disposal to discuss in detail the many causes of mine accidents and to point out all the preventive measures that may be and should be used. Nor shall I burden you with statistics of fatal and nonfatal accidents in the various classes of mines and quarries in the State, and compare these statistics with those for other States and the whole country. Neither is it my intent to dwell at length on the work of the Federal Bureau of Mines or to discuss matters concerning which opinions differ widely, such as the relative duties and responsibilities of the operators and the miners, or the risks taken by miners and by men of less experience.

We are all familiar with the excellent work being done by the Pennsylvania State mine inspection service, and I believe we all are ready to acknowledge the debt that the mining industry of the country owes the chief mine inspector of this State for his efforts to make mining safer, and especially for the wealth of detailed information on mine accidents that he has given to the industry through his annual report. As that information is readily available I shall not attempt to review it, nor to discuss it in any detail. However, as the theme assigned me is "Mine Accidents and Their Prevention," I shall briefly outline some of the chief causes of mine accidents and offer for your consideration a few suggestions on their prevention. Inasmuch as out of the 383,000 miners reported as employed in this State in 1914, there were 362,000 employed in or about coal mines, I shall confine my remarks to coal mining.

THE GREATEST MENACE

Falls of roof and of coal are still, as they have been, the chief source of fatalities in coal mines. Other causes in the order of their importance are mine explosions (gas or dust, or both), mine cars and locomotives, explosions, and electricity.

The fatality rate in the Pennsylvania anthracite mines for five years, 1910-1914, inclusive, was 3.57 per 1,000 men employed, as compared with 3.31 per 1,000 in 1914. In the bituminous mines, the average rate for five years was 2.87 per 1,000 men employed, as compared with 2.18 per 1,000 for 1914. This reduction shows clearly that inspectors and operators are striving to reduce accidents, for the hazard of mining is undeniably on the increase.

The hazard is increasing because mines are becoming larger and are employing more men. Consequently, not only are there many more points in a mine at which fatal accidents may occur, but a great accident imperils the lives of many more persons. An explosion that might have killed 25 or 30 men a few years ago may now trap hundreds. Furthermore, the area of worked-out ground is larger, so that there are more abandoned rooms and entries in which gas and dust may accumulate to increase the risk of explosions as well as their violence.

DANGERS INCREASE

As mines grow larger they necessarily require more extensive haulage systems, more locomotives and more mine cars, and thus the danger from haulage accidents grows. As the mines go deeper, the upper workings of slope and shaft mines naturally become drier, and in bituminous mines the dust that accumulates in these upper workings is naturally dry, and the hazard of widespread explosions, unless preventive measures are taken, becomes much greater. Also, as the mines go deeper, the roof pressure increases, thus adding to the hazard of roof falls.

The increased risk due to these principal hazards is being combatted by efficient mine inspection in the various States, so that the fatality rate for coal mining in the United States as a whole has declined since 1907, being 4.87 per 1,000 in that year, and only 2.95, the lowest figure since 1898, in 1915. Inspection, education, and cooperation have brought about this gratifying result.

How much is being done by the State inspectors and by operators in the State of Pennsylvania will be evident from a few figures. In 1914, there were 43 companies in Pennsylvania that employed underground more than 57,000 men, yet had a fatality rate of only 1.76 per 1,000 men employed. These 43 companies averaged 566,112 tons of coal for each life lost, which is far above the average for the United States. One of the companies produced approximately 12,000,000 tons with a loss of only 12 men, or one death for each million tons of coal mined. Moreover, there are, in Pennsylvania, 13 coal companies that have not had a fatal accident in a period of 15 years. In 1914 there were 21 companies that produced in all 8,700,000 tons of coal and employed 9,144 men without having a single fatality.

EXPLOSION DANGER

Although falls of roof and coal cause by far the largest number of accidents, yet potentially there is in many mines grave danger of explosions which may kill large numbers of men, and for this reason are especially dreaded. In fact, were it not for the precautions already taken by many operators, particularly in mines that make more or less gas, the toll of life from explosions would be much larger than it is. I think one may safely say that if the mining methods and the care to prevent accidents were no better than they were 25 or 30 years ago, the number of disasters in the coal mines of Pennsylvania, because of the greater extent of the workings, the increasing depths, and the larger number of men exposed to hazards, would be appalling.

In view of the fact that some of the most gaseous mines in the world are found in the anthracite fields and that the dust in many of the bituminous mines of western Pennsylvania is highly explosive, I think that the mining industry is to be congratulated on the comparatively small loss of life from such disasters. Yet the number of deaths that do occur from explosions should be lessened. Fortunately, as regards anthracite mines, anthracite dust by itself is not explosive, but in those mines the precautions toward improving the ventilation at working faces, the increased use of electric safety lamps in place of flame safety lamps, and the more thorough education of the miners, are all tending to lessen the number of gas explosions.

SAFETY LAMPS

It is most gratifying to me that the electric safety lamp, with the development of which the Bureau of Mines has had much to do, has been so extensively adopted. I have not the figures for the number that are in use in Pennsylvania, but hope that with the new statistical forms which were planned at the recent conference of State mine inspectors in Washington such data will be available in the future.

In the bituminous fields of Pennsylvania, not only is fire-damp to be guarded against, but coal dust. Undoubtedly many improvements are being effected in the proper watering of the mines, as well as in the use of shale dust or rock dust, which has been found to be very effective in tests made in the experimental mine near Bruceton.

The efficiency of rock dust is now being tried out in cooperation with several operators in some of the large mines, and the results so far obtained are of much promise as regards both efficiency and cost. The efficiency of the method is being checked by the collection of dust in entries and rooms, after the rock dust has been applied, and the testing of these samples to determine whether the content of combustible matter is low enough to prevent propagation of an explosion. Rock dust also has the merit of acting like whitewash in whitening the surfaces of the mine passageways, so that the illumination by the miners' lights is much more effective, and in this way, probably, many lesser accidents will be prevented. The Bureau of Mines does not consider that rock dusting is any more effective in preventing explosions that watering, provided the coal dust is thoroughly wet, but there is much difficulty in keping coal dust wet where large volumes of air are circulating, whereas rock dust need be applied only from time to time (in some places not needing renewal for three or four months), according to the rate at which fine coal dust is deposited in the roadways.

Aside from the use of safer mine lamps and the greater attention given in bituminous mines to rendering accumulations of coal dust incapable of propagating an explosion, other preventive measures are having their effect.

AS TO EXPLOSIVES

Short-flame explosives were first introduced in the coal mines of Pennsylvania at Johns-

town in 1902, and since that date their use has increased rapidly. In 1909, the Federal Government established at Pittsburgh a station where explosives are tested to determine their permissibility for use in dusty or gaseous coal mines. The explosives that pass the tests and are approved for use under prescribed conditions are termed permissible explosives. Through the introduction of these quick-flame explosives a potential danger to life has been greatly lessehed.

In the bituminous coal mines the fatality rate from explosions has been reduced from 3.39 per 1,000 men employed, in 1903, to ninety-six hundredths per 1,000 men in 1914, largely as a result of the use of permissible explosives.

ELECTRICITY

Investigations have been made to determine the extent to which the use of electricity in coal mines may cause dust or gas explosions, and the ways in which the risk of miners being injured or killed by shock may be lessened. As the result of these investigations manufacturers have devised safer types of apparatus and the State of Pennsylvania has enacted a most excellent law governing the use of electricity in coal mines.

RESCUE APPARATUS

The relative merits of the various types of apparatus used by miners in rescue and in first-aid work at a mine disaster have been investigated, with the result that important improvements have been made. In connection with this investigative work the Bureau of Mines has conducted an educational campaign among miners throughout the country, training them in rescue and first-aid methods, so that in the event of a disaster there may be a sufficient number of trained men at or near the mine ready for immediate rescue and first-aid work.

With the cooperation of miners and mine operators, the bureau has developed this work, done through its rescue cars and stations, into an agency for aiding in the rescue of men imprisoned by mine disasters, for training miners in rescue methods and in first aid to the injured, and in advancing the general movement toward greater safety in all branches of mining. Not the least of the benefits resulting from this work is the promotion of good citizenship among miners through the demonstration of the Government's interest in their welfare.

The results of first-aid training are of direct benefit, not only in lessening accidents, but in decreasing the danger of infected wounds, suffering, and death after accidents. Although this training is part of the educational work of the bureau, other organizations and many private concerns are engaged in similar work, and the work is being extended by those who receive the training. First aid at mines was started in England about 1880 and in 1899 the Delaware & Hudson Co., through its physician and surgeon, M. J. Shields, organized a first-aid team in the anthracite field of this State. Since then this work has extended until nearly every large company has its first-aid teams. In 1913, 47 lives were saved by prompt treatment rendered by this efficient agency in the Pennsylvania coal fields.

HOSPITALS

In connection with first-aid, we may well think of the work being done by the hospitals that are now maintained by the State or by various corporations. Mr. Roderick, in his annual report for 1914, in summing up his statements with reference to hospitals at mines, says: "There are 58 hospitals at which during the year treatment was given to 12,153 miners, and 4,774 members of miners' families. Ten of these institutions are supported entirely by the State; 47 by State and contributions from other sources, and one by the Cambria Steel Co. alone. The State appropriation for these hospitals in 1914 was $1,165,284."

EDUCATION

Educating miners to a realization of the dangers to which they are exposed must inevitably aid in reducing accidents. Educational work is being done by mining institutes, vocational schools, and the Y. M. C. A. In addition, a number of the larger mining companies are conducting educational campaigns for the benefit of their employes by publishing and distributing circulars and pamphlets. Particularly worthy of note is the small volume published in 1912 by the Deleware, Lackawanna & Western Railroad Co., and entitled "Mine Accidents and Their Prevention." This publication contains 200 illustrations which show the miner the risks he takes in his daily work, and one of its purposes is to give a knowledge of colloquial English to the non-English-speaking workers.

The Federal Bureau of Mines is conducting its educational campaign by giving instruction in first-aid and rescue work, and by publishing and distributing miners' circulars, technical papers, and bulletins relating to accidents and diseases and their prevention. In some States—I trust their number will increase—the mine inspectors have adopted the plan of appealing directly to the miner through the medium of brief circulars or leaflets.

COOPERATION

Probably the most notable accomplishment of the Bureau of Mines in its efforts to increase safety in mining has been the gaining of the cooperation of all possible agencies in behalf of this movement. The bureau has steadfastly endeavored to enlist the support of all State and Federal agencies already in operation. Further, it has solicited the cooperation of mine operators and representatives of organized labor. It is only one of

several agencies working to accomplishe a great end, and whatever results it has obtained have been made possible through the efforts and assistance of the individuals and organizations mentioned.

The fact that large employers of men and persons interested in mine accidents and their prevention are gathered here to take cooperative action leads me to place especial stress on the subject of cooperation. One point that I wish to make is that cooperation to prevent accidents is not always as inclusive as it should be. No one is so vitally interested in accident prevention as the workman himself, yet in many workshops and in many mines throughout the country there is no cooperation among the men to this end. On the other hand, there are establishments where such cooperation prevails, and in these you find the lowest accident rates and the lowest fatality rates. Further, if you will inquire at any factory or mine that is working in a cooperative way with the men you will find there has been an almost startling decrease in the number of fatal accidents.

My plea is that each mining company, and each industrial establishment represented here shall appoint from among the men at its plants a committee or committees on safety, or have the men appoint the committee and organize for safety work.

The appointment of committees of miners to examine conditions in the mines in which they are employed is authorized in Great Britain by the Miners' Act of 1911. I think such provision is part of the mining law of Prussia. At least one large iron-mining company in this country has voluntarily adopted the system.

QUESTION BOX

At a number of establishments it has been the custom for years to maintain a question or suggestion box in which the men are invited to place any suggestion for better or more efficient ways of doing work. I am told that many of the suggestions have been worth thousands of dollars to the plants concerned. Why not make the suggestion box universal and give the men to understand that they are at all times requested not only to make suggestions on efficiency, but also on safety? Employes should be encouraged to point out a dangerous place about a factory or a mine and to suggest a remedy if they have one. Some men are timid about signing their names to such suggestions, fearing that perhaps a foreman or boss will think they are presumptuous. Hence, it is well to allow any man to make a suggestion or suggestions anonymously. The safety committee could discuss these suggestions, and if necessary talk them over with the man making the suggstion, if he signed his name, or take them up at some general meeting of the men.

Anyone who has not tried this plan or seen it in operation will be surprised at the value of the suggestions it brings forth, suggestions that might not otherwise be thought of by the men in charge or even by the safety committee itself. The plan illustrates the long-known fact that the thoughts of many men are apt to be better than the thoughts of one man. You have seen this fact demonstrated in your daily life, in your conference with your office officials, and especially in your business dealings.

A number of the mining companies of the United States have already endeavored to assure the cooperation of their men, not perhaps as much through a suggestion box as through the employment of a safety engineer or inspector who visits frequently all parts of the establishment or mine and confers with the men on improvements that would increase safety.

As one result of its activities the Bureau of Mines is being called on to supply men who can serve as safety inspectors. As the mining industry reaps the benefit, the bureau is glad to supply such men, although it has to train a new man until he is as efficient as his predecessor.

In conclusion permit me to state that whatever you do to decrease accidents, your efforts must be positive and continued. Eternal vigilance is the price of safety as well as of liberty. You must keep up the campaign; you must show the men every day that it is their campaign, that their safety is involved, and that thoughtlessness means suffering and death to them and possibly poverty and want to their families. Even compensation laws, splendid in themselves, do not prevent the taking away of a father from being an irreparable loss to his boys and girls.

Death from accidents will continue. Each industry has hazards that cannot be abolished. But in the United States the death rate from accidents is still inexcusably large. Some statisticians contend that 35,000 workmen are killed in the United States each year while following their occupations and that 2,000,000 are injured. For my part, I firmly believe that the present number of leaths and injuries from accidents could be cut squarely in half in perhaps two years' time were the movement for greater safety to receive throughout the country the attention that it deserves.

To save workmen from injury and death is not only humanitarian (and this alone is sufficient reason for making every possible effort), but also a direct contribution to national efficiency. The impoverishment of the world's supply of trained workmen through the unparalleled slaughter of men in Europe may soon be felt seriously in the United States. This country, in outstripping all others in industrial growth, has had to take yearly many thousands of men from Europe. It is possible immigration will decline greatly, that this country will not be able to obtain the men its industries will require. One result of such a condition will be that the

value of a human life will be much greater than ever before. You may call that the economic side. I call it the sordid side. But outside of any such considerations we should, merely as citizens of this great nation, strive continually to do all we can to reduce injuries, suffering, and death from accidents. The work is not one to be delegated exclusively to a State or a Government bureau. It concerns each one of us, and our efforts to improve conditions should be part of our daily life.

DEATHS IN COPPER MINES ARE 3.69 PER 1000 MEN EMPLOYED

Copper mines accidents statictics of the Bureau of Mines are compiled from reports of 585 operators of copper mines employing 44,686 men, of whom 31,265 were employed underground and 13,421 on the surface. Of the 585 operators, 371 were working prospects and small mines in which less than 1,000 days' labor was performed. The other 214 were operators of mines where 1,000 or more days' labor was performed.

The total number of deaths and injuries due to accidents, and the rates per 1,000 employed, are as follows: Deaths, 165, or 3.69 per 1,000 men employed; serious injuries, 2,307, or 45.58 per 1,000; slight injuries, 11,330, or 253.55 per 1,000. Of the total number of fatalities, 147 occurred underground, making the rate per 1,000 employed 4.70. The number of surface fatalities was 18, or 1.34 per 1,000, as statistics of the Bureau of Mines show.

Although the ratios of serious and slight injuries for this group of mines appear exceedingly high, this is not so much due to greater hazards as to the fact that the copper mines are worked by well-organized companies practically all of whom have a safety department in charge of a competent safety engineer. The result is that accurate records are kept, and it is believed that the records shown by both the copper and iron mines of the United States represent more nearly the actual hazard in the mining industry than do the records for any other group. One class of injuries in the copper-mining industry that increases the accident rate is due to the character of the ore handled in the Lake Superior district. Much of the rock in this district contains metallic copper and the men receive many cuts and scratches in handling it.

MAX BALL NAMED FOR BUREAU OF MINES POST

Max Ball, who has been connected for a number of years with the Land Classification Bureau of the U. S. Geological Survey, has accepted a position of Law Examiner in the Bureau of Mines. He will begin his new duties April 1. He succeeds C. B. Dutton.

ON 300-DAY BASIS FATALITIES ARE LESS IN METAL MINES

The majority of the coal-mining States have systematic coal-mine inspection, which tends to reduce the accidents; whereas many of the metal-mining States have no inspection service, says Albert H. Fay, of the Bureau of Mines.

On account of the great disasters that occur in coal mines and the prominence given to them by the newspapers, coal mining is usually considered much more hazardous than metal mining.

Metal mines usually do not claim their death toll in disasters that involve many men, most of the men who die from accidents being killed one at a time. Altogether, there were reported in the metal mines in 1914, 32 accidents in which 2 or more men were killed at one time, making the total thus killed 81, or 14.5 per cent of all the fatalities, as compared with 11.6 per cent in 1913, 12.3 per cent in 1912, and 19.5 per cent in 1911.

Although the fatality rate in metal mines during 1914 was 3.54 per 1,000 men employed, and in coal mines 3.22, yet the comparison is not absolutely fair, for the reason that the metal miners worked 271 days as compared with 207 days for the coal miners. Thus the men in the metal mines were exposed to the mining risk of 64 days longer than were the coal miners. If both rates be reduced to the 300-day basis, the metal-mine fatality rate becomes 3.92 per 1,000 300-day workers in comparison with 4.67 for the coal mines and 2.64 for quarries.

Information has been compiled from official reports of representative foreign countries in which mining is an important industry. The figures show that the fatality rates are lower than those of metal mines in the United States. One reason for the difference is that for many years rigid inspection has been enforced in most of the important foreign mining countries. In the older nations, as Great Britain, Germany, and France, the majority of the miners have worked about mines from childhood, as did their fathers and grandfathers before them. Another reason is that in these countries the majority of the miners speak a common language, and there is comparatively little misunderstanding of orders given by mine officials.

In the United States it is not uncommon to find at a large mine men representing 10 or even 20 nationalities, a very large percentage of whom cannot speak English nor understand a language other than their own. An Italian and a Swede may work side by side in a mine under a shift boss who gives his orders in English, a language not understood by either of the two men. In case an accident happens the survivor testifies through an interpreter before the coroner's jury that he thought the orders of the shift boss—not at all what they actually were—were "so and so." A common language is essential to safety in mining.

APPEAL TO PRESIDENT FOR COAL COMMISSION

Letters have been received by the President, Senator O'Gorman and Representative Daniel J. Riordan from 250 real estate, civic and commercial organizations throughout the country. The letter asks that a federal commission be appointed to make a full investigation of the coal situation. It is specified that the methods of coal distribution and the cost to the consumer should be given special attention.

The text of the letter to the President is as follows:

"In consequence of the unsatisfactory condition of the coal situation existing at the present time, and appreciating the serious results that a continuance of same will have upon the consumers of coal, the Real Estate Board of New York, together with the New York Building Managers Association, and other kindred interests, have been in conference in an endeavor to reach a conclusion as to the best method to pursue to relieve the present condition and to prevent, as far as possible, a recurrence of same in the future.

"It is the consensus of opinion of those in conference that the remedy lies with the authorities at Washington. Therefore, we most respectfully request that a commission be appointed to make a full investigation of the coal situation, in connection with the methods and means of distribution and marketing of coal and its ultimate cost to the consumer. Many of the reasons advanced by distributing agencies for the lack of quality and quantity of supply, merit, in the opinion of the petitioners here, a close investigation of the conditions relating thereto. Irrespective of whether or not a strike occurs, it would be an easy matter for the operators to settle the wage question with the miners and make the consumers pay excessively for same.

"During the strike of 1912 the commission appointed by the President of the United States was successful in bringing the operators and miners into an agreement which expires on April 1, 1916. It is, therefore, respectfully submitted that a similar commission be appointed immediately, that a thorough investigation may be made with the object of preventing a strike, and securing, if possible, the delivery of coal on an equitable basis."

The letters were written after a joint conference committee, appointed by the Real Estate Board of New York and the New York Building Managers' Association, had deliberated for some time on the advisability of taking such action. The members of the committee, all of whom are associated with leading real estate firms in New York City, was made up of W. J. Van Pelt, chairman, of George Reed & Co.; W. L. De Bost of Cruikshank & Co., W. T. Ropes of Horace S. Ely & Co., F. S. Bancroft of Pease & Elliman, and M. D. Littlefield and B. E. Martin.

The committee reported back to the two associations that the situation justified some such action as contemplated, and it was decided to ask every organization in the territory affected, that might be interested, to join the movement.

The following letters were accordingly sent to the presidents of 250 civic and commercial bodies in the cities in which conditions similar to those in New York exist:

"Owing to unsatisfactory coal conditions, a joint conference committee of members of the Real Estate Board of New York and the New York Building Managers' Association has deemed it advisable to investigate this situation promptly. With this purpose in view, we have written letters, as per the enclosed, to the President of the United States, Senators and Congressmen of our respective districts. If you are interested in this matter, we earnestly ask your prompt support by taking similar action. This is a situation which needs united and prompt action to secure results. We are asking allied interests in many sections for like support. Irrespective of a miners' strike (for which, in the final settlement, the consumer will pay the bill), we believe the situation should be promptly investigated to ascertain if coal is delivered to the consumer at a reasonable margin of profit to the following units: Miners, operators, transportation companies and local dealers. If it is found that any of the above units are receiving an unfair return, we respectlly request that action be taken to adjust same at once. It is rumored that the anthracite operators expect to change the sizes of coal delivered. We also believe that the efficiency of this change, as relates to the consumer, should be investigated."

Mr. Van Pelt said that the Merchants' Association of New York City had joined the movement and had sent letters to Washington, asking for the federal commission. He said a reply was expected in a few days.

FRICK COMPANY ORIGINATED SLOGAN OF "SAFETY FIRST"

George S. Rice, chief mining engineer of the Bureau of Mines, in explaining the origin and popularizing of the term "safety first," says: "The term 'safety first' was introduced by the Frick Company, of Pittsburgh, in conjunction with 'safety, the first consideration' and was more or less used around their plant. Whey they purchased certain mines in Illinois the same signs were extended to these mines. Someone out there, I do not know who, changed the phraseology to 'safety first.' So far as we know the Frick people were the first to use this, but it was first publicly used on banners, etc., at the big demonstration conducted on Forbes Field in Pittsburgh, Pa., by the Bureau of Mines in 1911. Since that time the Bureau of Mines has had much to do with popularizing the slogan. I think that there has been rather close connection with Dr. Holmes' efforts and the expression 'safety first,' although we cannot say that Dr. Holmes invented the term."

TONOPAH ENRICHMENT EXTENDS TO A GREAT DEPTH, GEOLOGICAL EVIDENCE SHOWS

Important Study of Great Nevada Camp Made by E. S. Bastin and F. B. Laney of United States Geological Survey—Rich Silver Ores Declared to Be of Primary Origin—Ratio of Gold to Silver Is 1 : 91

Observations of great value to the miners at Tonopah have been made by E. S. Bastin and F. B. Laney, of the U. S. Geological Survey. They made field studies of the district extending over more than a month in the spring of 1915. This was followed by several months of laboratory work upon the ores.

Their investigations were intended to supplement the work of J. E. Spurr and J. A. Burgess on the geology of this district. They are applying to the ore methods of microscopic studies which were not in use by economic geologists at the time the Spurr reports were prepared. These microscopic studies of ores in other districts have proved of material assistance in interpreting the origin of ores.

From the discovery of Tonopah ores in 1900 the importance of the camp has increased year by year until in 1913 its silver production was exceeded only by that of Butte among the other mining camps of the United States. Its metal output since 1904 is shown in the following table compiled by V. C. Heikes, of the Geological Survey:

The copper and lead are from properties closely adjoining the district. The total value of the production for the years tabulated above is nearly seventy million dollars, and dividends have been paid amounting to twenty-one million dollars.

The average ratio of gold to the silver in ounces recovered during this period was about 1 : 91.

The total average value per ton of the ore produced in 1913 was $16.71, and in 1914, $16.84. The largest part of the ore mined is treated by cyanidation, with or without concentration. In certain plants it is stated that ore as low as $8 in assay value under certain circumstances can be treated profitably, according to Mr. Bastin.

A summary of the more important conclusions reached by Messrs. Bastin and Laney are as follows:

(1) Evidence is presented to show that the rich silver ores now being mined at Tonopah are in the main of hypogene or primary origin.

(2) The geologic evidence is favorable to the occurrence of rich primary silver ores to depths considerably greater than those yet attained in the mining operations. Mining has shown, as would be expected, that in certain veins the primary sulphides become less abundant with depth though the same species are present; all veins must of

Ore sold or treated in Tonopah District, Nye Co., Nev., in 1904–1914, number of producers, and total content of gold, silver, copper, and lead

Year	Number of producers	Ore, short tons	Gold value	Silver, fine ounces	Copper, pounds	Lead, pounds	Total value
1904	10	22,703	$386,526	2,119,942	.....	.....	$1,594,893
1905	12	91,651	1,206,345	5,369,439	.....	.....	4,449,486
1906	9	106,491	1,304,677	5,697,928	.....	.....	5,122,289
1907	10	214,608	1,183,628	5,370,891	5,939	195,508	4,739,966
1908	13	273,176	1,624,491	7,172,396	.....	.....	5,425,861
1909	9	278,743	1,400,361	7,872,967	1,784	1,488	5,494,600
1910	18	365,139	2,303,702	10,422,869	942	6,902	7,932,475
1911	19	404,375	2,366,495	10,868,268	.....	.....	8,126,677
1912	17	479,421	2,223,878	10,144,987	14	700	8,463,079
1913	32	574,542	2,613,843	11,563,437	1,150	9,001	9,598,733
1914	23	531,278	2,648,833	11,388,452	2,284	924	8,946,987
Increase (+) or decrease (—) in 1914		—43,264	+34,990	—174,985	+1,134	—8,077	—651,746

course have endings. The veins developed by other deep workings are heavily mineralized and of high grade.

(3) Although hot ascending waters are encountered in a number of the deeper workings there is no evidence that these are depositing ores; their chemical composition, in fact, precludes the possibility of such deposition.

(4) The primary or hypogene ores have been modified locally by oxidation and enrichment through the agency of the air and oxygenated solutions of surface or near-surface origin.

(5) There is evidence not only of recent oxidation of the ores, but also of at least one period of ancient oxidation. Supergene sulphide enrichment was probably an accompaniment of each of the periods of oxidation.

(6) The high silver content of much of the ore obtained in the past and of some ore now mined is unquestionably attributable in part to supergene or downward enrichment.

An unusual number of photographs and drawings showing the microscopic characters of the ores were made.

These drawings show that the rich silver minerals were in part deposited at the same time as the commoner sulphides of the ores, but that they also occur as replacements of these sulphides and as depositions along open fractures. Many of the replacements appear to have formed during the primary mineralization, but other replacements and most of the depositions in fractures were probably the result of downward enrichment through the agency of surface waters descending through the lodes.

Analyses of the hot deep waters of the lodes and an analysis of cold acid descending water were made.

MOVES LABORATORIES TO UNIVERSITY OF CALIFORNIA

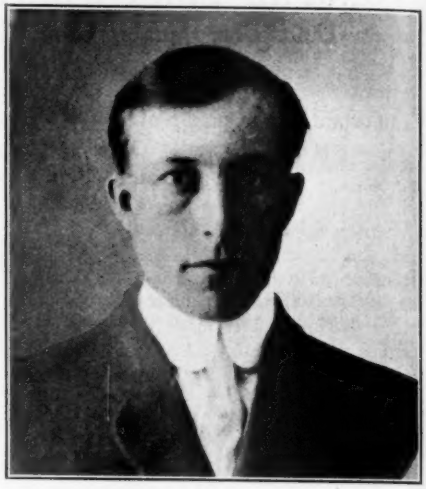
The laboratories of the Bureau of Mines at San Francisco are being moved from the Custom House to the University of California. Arrangements have been made for cooperation between the Bureau and the University which insures the Bureau of more commodious quarters for its laboratory work, and in addition gives it the advantages of the University's equipment.

This change, however, will not affect the work being done by Prof. G. H. Clevenger at Stanford. His investigation on cyanide processes will continue.

CLOSER COOPERATION WITH BUREAU OF MINES LIKELY

Growing out of the cooperation between the Bureau of Mines and the Metal Producers' Association of California and the Nevada Mine Operators' Association, which began at the San Francisco Exposition, a much more comprehensive effort to work together in conducting experiments in cyanide is very likely to result.

GOVERNMENT EXPERTS WELL KNOWN TO MINE OPERATORS



E. S. BASTIN, GEOLOGIST

Dr. E. S. Bastin was born in Chicago in 1878. His early education was in the public schools there and in Philadelphia. He was graduated from the University of Michigan in 1902, and his technical training was received at the University of Chicago, from which institution he received M.S. and Ph.D. degrees.

He began work on the U. S. Geological Survey in 1904. In 1913 and 1914, however, he returned to the University of Chicago where he lectured on Economic Geology. Until 1910 Dr. Bastin was engaged in general geological work in Maine.

His principal published works during that time are: Geology of the Pegmatite Deposit of Maine and folios of the Rockland and Eastport districts. He also collaborated in the work on Penobscot Bay.

He then began work on Economic Geology. In 1910 to 1913 he worked with Dr. Ransome in the Breckenridge district of Colorado. This was followed by a study of Gilpin County and adjacent portions of Boulder and Clearfield counties of Colorado, with J. M. Hill. Since that time he has been engaged in the study of the origin of the rich silver ores and in connection with that study has visited the Ouray Telluride and Red Mountain camps in the San Juan region of Colorado; Aspen, Colorado; Patagonia, Pierce, Wickenburg, Kingman and Chloride in Arizona; Tonopah and Virginia City in Nevada.

Since 1906, in connection with the mineral Colorado; Patagonia, Pierce, Wickenburg, Kingman and Chloride in Arizona; Tonopah and Virginia City in Nevada.

ZINC OPERATORS ARE URGED TO PREPARE FOR RETURN OF NORMAL COMPETITION

Judge W. D. Hoag Points to Increasing Production in Mountain States, Heavy Australian Imports and Possible Mexican Production as Serious Menace to Joplin District Once Present Abnormal Demand Ceases

In a stirring address before the Southwestern Mine Safety and Sanitation Association, at Webb City, Mo., Judge W. D. Hoag urged that the opportunity offered by the present prosperity among zinc miners be seized to place the industry upon a better basis. He believes now is the time to prepare for the keen competition certain to come with the restoration of normal conditions.

The value of the output of our ore the past year went far past the high-water mark of other years. As a result both sheet-ground and soft-ground are in demand. Ore is being produced at a profit and the operator is finding the balance on the right side. As in the days when oil was struck in Pennsylvania, "Everybody had oil on the brain," so now everybody is talking zinc ore. We seem to be on the "high tide" of prosperity.

A number of years ago when Charles Dickens visited this country and conducted one of his reading tours, he was asked to say what he thought of this country, and he said, "Everything is humming, but it is not all hum; everything is coming, but it has not all come."

And so today there is a minor strain in our music. There is a feeling that our business should be on a better basis.

In such times as these it behooves us to stop a moment and inquire what has brought about these conditions. Will they continue?

It is admitted that the present condition is an abnormal one, and when the war closes the demand for our product will be lessened.

AUSTRALIAN ORE

Australian ore has found its way to this country and the capacity of the Pennsylvania smelters is now being taxed to their utmost to treat the present importation.

The high price of zinc ore has stimulated its production in the Mountain States, which lessens the demand for our product. It is fair to presume that this production will continue to a considerable extent.

We have enjoyed a certain "protection" from the importation of Mexican ores of late, due to the internal troubles in that country. We cannot reasonably expect immunity on this ground much longer.

In view of these conditions, what ought we to do?

We are not as those without experience.

THE QUESTION OF TARIFF

In 1908 and 1909 the district unanimously demanded an adequate tariff on the importation of zinc ore. A Congressman was elected on that issue and Congress passed a law providing for a "graduated scale" in the lower grades, but the ore which largely predominates in the Joplin District was protected by a duty of one cent per pound on the metallic contents contained therein. At the incoming of the present administration that law was repealed and we now have only a nominal tariff.

It is not my purpose to discuss the merits of protection, but I believe it to be the consensus of opinion of the operators of this district that a tariff on zinc ore is very important—in fact, necessary, under normal conditions.

The people who need this protection are Republicans and Democrats alike. There should be no politics in this proposition. It should not be made a party measure. Democrats are as desirous of prosperity as are Republicans. There is but one remedy, viz., a non-partisan tariff commission—a commission big enough to ignore popular clamor and treat all interests in a fair and judicial manner—a tribunal that will become as high and as sacred in the minds of the people as are our highest courts; only men of known integrity, of great ability and high character should be selected for such a position. Ample appropriations should be made so that the best engineers, auditors and accountants will get the facts and place them before the commission.

WILL ACCEPT DECISIONS

This district will accept the findings of such a Commission when the facts have been intelligently laid before them.

Under the present system our interests are at the mercy of politicians. Tariff is the football of politics. This subject should be lifted out of that sphere and placed on a business basis.

It must be remembered, however, that Congress is the only power that can "lay and collect taxes, duties, imposts and excises." The commission can only be advisory. However, we can reasonably expect that Congress would be influenced largely by the findings of a commission such as we have considered and would enact laws largely in keeping with its recommendations.

Certainly, it would be a great satisfaction if our operators could state their case to a competent corps of engineers rather than a partisan commission among men of all par-

tisan committee that does not have time for an intelligent consideration of the subject.

There is a growing demand for a non-partisan commission among men of all parties; especially is this true with business men.

FAVORED BY MINING CONGRESS

The American Mining Congress and the United States Chamber of Commerce, both national organizations, are endeavoring to secure the enactment of a law that provides for such a Commission. This district should aid in the effort. It would be eminently fitting and proper that this work should begin here and now.

The men of this district have always gone to the front when an emergency has arisen.

There is a certain amount of "preparedness" that all successful men must make.

Is not this the time for the men of the Joplin District to begin to "prepare"?

FIFTY THOUSAND LETTERS SHOW PUBLIC'S INTEREST IN MINERALS

Many persons in the United States evidently think of the United States Geological Survey as a great bureau of geologic information, for the Survey answered 50,000 letters of inquiry last year concerning the earth's crust and what it contains. Letters come from all parts of the country at the rate of about a thousand a week, asking the name, source, character, use and value of minerals, and the location of various kinds of rocks suitable for different uses. These letters ask not only about the geology of this country, but also about the rocks and minerals of foreign countries. More and more inquiries for information about our mineral resources are coming from South and Central America. The representative of one foreign country wanted to know where to get a large supply of coal of a particular grade, and a purchaser from another country wanted to place an order for monthly shipments of several hundred tons of lime.

The Survey is in close touch with the 90,000 producers of minerals in the United States, and is ready to answer questions about the annual production of 70 different minerals or mineral products. Furthermore, the Survey knows the places in the United States where more than 425 different minerals may be found, so that it is in a position to act as the public agency in bringing the mineral producer and consumer into touch with each other.

Federal law prohibits the Survey from making special examinations, such as assays and analyses for private individuals, but the geologists can make simple mineral determinations and give information as to the identity and use of minerals submitted. It is an everyday occurrence for the Survey to answer many such questions as these: "What is this mineral, and if it is of value, where can I find a purchaser?" "Where can I get a supply of sand in my own State that will analyze 97 per cent silica?" "Where does platinum occur?" "In what geologic relations is manganese ore found?" By answering the many and miscellaneous inquiries for geologic information the Survey is becoming increasingly valuable to the public.

Many an inquiring citizen is referred to his own State survey for more detailed information, for many people do not know that they have in their own State an officer or organization ready to answer questions about the geology and mineral resources of the State. There are now 41 State geologists, or equivalent State officials, many of them working in cooperation with the Federal Survey.

MAMMOTH COPPER COMPANY EMPLOYS SAFETY ENGINEER

John Herschel East, Jr., of the United States Bureau of Mines, has accepted a position with the Mammoth Copper Company and will take entire charge of the safety work at the company's big copper mines at Kennett, Shasta County, Cal.

This is the first appointment of a safety expert from the Bureau of Mines to be made by any of the California mine operators, and is looked upon by the advocates of mine safety as an auspicious bit of news.

East has been with the demonstration car of the Bureau of Mines in Michigan. There are about 1,500 men employed at the Mammoth mine, about 600 of whom work underground.

Edwin Higgins, chief mine inspector for California, has returned from an inspection tour of the mines in the Mother Lode district, and reports that he is more than pleased with the way in which the mine operators have accepted the new safety laws which went into effect the first of this year.

"Everywhere I found the attitude of the operators to be that of cooperation," Mr. Higgins is quoted as saying. "We don't expect to revolutionize the situation overnight, and I was agreeably surprised at the progress that has already been made by the operators in conforming to the new laws.

"Two cooperative stations are to be established in the Mother Lode district, one at Jamestown and the other at Sutter Creek, where all the equipment for rescue work will be assembled and held in readiness for instant call."

NEVADA CHEMICAL COMPANY TAKES OVER POTASH CONCERNS

The Nevada Chemical Company, a Nevada corporation, has been organized to take over all potash matters with which Victor Barndt is concerned. The authorized capital is $1,000,000. In its contemplated activities the Nevada Chemical Company will be allied with important interests in the chemical, alkali and fertilizer trades. Adequate financial support is assured, it is said.

ROCK-DUST METHOD OF RENDERING COAL DUST INERT MEETS GENERAL FAVOR

Bureau of Mines is Trying to Interest Machinery Manufacturers in Epuipment for Applying Rock Dust in Coal Mines—Cost an Important Feature in This Effective Safeguard Against the Initiation of Mine Explosions

The Federal Bureau of Mines has made a large number of explosion experiments at the experimental mine at Experiment, Pa., to determine the efficiency of rock dust in preventing the initiation of mine explosions and in checking them after they have been initiated. The proportion of shale dust to coal dust required, to prevent or check explosions has been determined for coal dust from many seams.

The rock-dust method seemed to have such an advantage over watering methods in which water is applied infrequently, in that more constant protection is afforded, that arrangements were made with a coal company in the Pittsburgh district to rock-dust a part of one of their mines and keep accurate account of the costs. Bureau engineers inspected the rock-dusted zones from time to time and took samples to insure that the zones were in safe condition. This work was continued for a year, the entries being redusted from time to time as the occasion required. The test has been so satisfactory that the dusting has been extended to three other mines, and conferences have been held with officials of other companies for the purpose of explaining results with the view to adopting the method. Considerable interest has also been shown in other parts of the country, particularly in Colorado, where rock-dusting has been carried on in the Delagua mine of the Victor American Fuel Co. for more than four years. The probable wide adoption of this method of rendering coal dust inert, therefore, makes desirable the development of suitable machinery both for preparing the dust and for distributing it.

SIZE OF MATERIAL

The first rock dust that was used in the Pittsburgh district was pulverized limestone dust of such fineness that about seventy-five per cent would pass through a 100-mesh sieve. This material was very satisfactory, but a coarser material would be easier and cheaper to prepare, therefore explosion tests were made in the experimental mine to determine the relative efficiency of fine and coarse material. It was found that material prepared by grinding in a hammer crusher, equipped with a one-sixteenth-inch slotted screen, was only a little less efficient than the pulverized dust. It is believed that suitable equipment to furnish such dust can be obtained at a low cost.

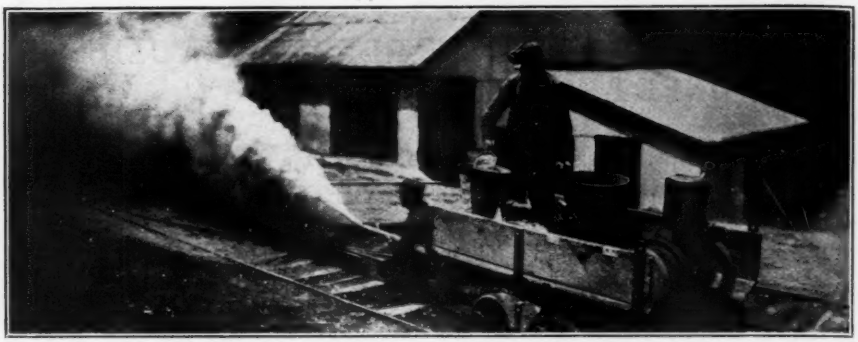
In rock-dusting a mine entry, the best way to apply the first coating is, under most conditions, to throw the dust on by hand, because a thicker and better distributed coat is obtained. In time, coal dust settles on the rock duct, and redusting is desirable. This is best done by a rock-dusting machine, which blows into the air current a cloud of rock dust that settles in a mantle over the coal dust. The use of a machine decreases the cost and increases greatly the convenience of redusting. Such a machine, as used at the experimental mine and similar to one in use at Delagua, Col., is shown in operation in the accompanying photograph.

In order to stimulate interest in the development of suitable machinery for use in connection with the rock-dust method of rendering coal dust inert, the Director of the Bureau of Mines is addressing the crusher and blower manufacturers as follows:

"As the result of mine-explosion experiments at the experimental mine and explosion-prevention investigations in the field, the bureau is strongly recommending the use of finely crushed, or pulverized rock dust, having no or a very small percentage of combustible matter, as a preventive for coal-mine explosions.

"Nearly all mine explosions in bituminous coal mines, once initiated, are extended by the fine coal dust that is found on the surface of most mine entries. This dust, when blown into a cloud, is very explosive. If rock dust is thrown on the surfaces, it covers the coal dust or becomes mixed with it, and if sufficient is used, the cloud of dust blown from such surfaces in the event of an explosion is non-explosive and quenches the flame. The more finely divided the dust is, the better it is for rock-dusting. Tests have indicated, however, that a dust all of which will pass through a one-sixteenth-inch slotted screen, and having about 40 per cent through 100-mesh and 25 to 30 per cent through 200-mesh screen, is satisfactory for the purpose. Further detailed information concerning the use of rock dust in mines can be obtained from Bureau of Mines Technical Paper 84, a copy of which I am sending under separate cover.

"A number of mines in Pennsylvania and Colorado are now using the rock-dust method of rendering coal dust inert and its



BUREAU OF MINES PHOTOGRAPH
Rock-dusing machine in operation.

installation in a large number of other mines is being considered.

"At the present time many of these mines are purchasing limestone or other rock dust for this purpose, but, in order to make the method as cheap as possible, it is desirable in many cases that the dust be ground either at the mine where it is used or at some conveniently situated central point for a group of mines.

"The bureau desires to inform you of this new field for crushing or pulverizing machinery. Information as to whether your company now has machines, which will furnish material as fine or finer than that given above, the output per hour, horsepower required and cost will be appreciated."

To blower manufacturers:

"It is desired to call your attention to the demand which has arisen in connection with the work of prevention of coal-dust explosions in mines for a machine designed to blow a cloud of rock dust. This will probably be of interest to you, as a positive blower is one of the essential parts of the apparatus.

"One of the methods now strongly recommended by the Bureau of Mines for the prevention of coal-dust explosions is to coat the mine entry surfaces with rock dust so that in the event of an explosion, a thick rock-dust cloud will be formed and quench the flame. The first coating of rock dust is thrown on the mine entry surfaces by hand. After a time, some coal dust settles on the rock dust and it becomes desirable to apply another coating of rock dust; this is prabably most conveniently done by the use of the rock-dusting machine. It blows a thick cloud of dust into the air current, which carries it for long distances, the dust gradually settling out and forming a mantle over the coal-dust deposits.

"The apparatus, as used at the experimental mine of the Bureau of Mines, consists of a small positive blower, the air from which passes through a 2-inch pipe to the injector chamber, into which the rock dust is fed from a hopper; the air and dust, becoming mixed in this chamber, is blown through a hose into the atmosphere.

"The attached blueprint shows an outline arrangement of the apparatus. The blower used has a volume of about 288 cubic inches and is run at about 1,000 R.P.M.; the pressure in the outlet pipe when the machine is operating is about two pounds per square inch.

"The injector chamber should be carefully constructed. The 2-inch air inlet is reduced to a nozzle of 1-inch opening and the nozzle should extend far enough into the chamber of the 3-inch tee, so that the nozzle opening is below the outer edge of the dust-hopper opening. The dust then falls or is drawn forward into the air stream and is blown through the hose. A flexible hose is desirable for an outlet so that the air stream can be pointed in any direction; also this permits its connection to pipes through stoppings to direct the dust stream into air courses or entries having no track and which ordinarily receive no treatment to render the coal dust present inert.

"The power to drive the rock-dusting machine is furnished by a small gasoline engine in the experimental mine apparatus, but should be furnished for use in dusty mines by a small totally inclosed electric motor or other equipment complying with approved safety standards.

"As the rock-dusting method of rendering coal dust inert is now being taken up actively, it is believed that there will be a considerable demand for such apparatus. Information as to whether your company could furnish such equipment and the approximate cost of the same would be appreciated."

NEW STATISTICS TO COVER DATA REGARDING CONSUMPTION OF COAL

Geological Survey Takes Steps to Meet Demand for this Class of Information—Question of Markets More Valuable than Question of Source of Supply—Movement of Coal from Mine to Point of Ultimate Consumption Will Be Shown

The demand for statistics covering the consumption of coal is so great that the U. S. Geological Survey has decided to furnish them. These figures are more in demand than production figures, although, of course, the former cannot be compiled unless the latter be obtained. Consumption statistics show essentially markets, and in the present day the condition of the coal industry is such that the question of markets is of more vital interest than the question of source. It is believed that the figures which will be obtained, although possibly not showing the disposition of 100 per cent of the product, will be so nearly complete as to warrant their unreserved presentation.

The Survey is now engaged in collecting 1915 figures showing the quantity of coal from each producing area which is consumed in each State. Over 1,000 inquiries have been sent out to selling agents and shippers, asking for details regarding the source and destination of the coal handled by them, and the figures obtained in this way will be supplemented by other information along these lines already available to the Survey. The aim of these statistics, which are supplementary to the figures of production now collected and published by this Government Bureau, is to show the movement of coal from the field where it is mined to all of the consuming districts.

Prominent men in the coal trade with whom C. E. Lesher, who has charge of the investigation for the Geological Survey, has conferred, state that the figures will be of great value, particularly in rate investigations.

In commenting on the new consumption statistics a prominent anthracite man says:

"As there are relatively few producers of anthracite as compared with the number of distributors and consumers, I suppose it might be assumed that there are more persons interested in the consumption than in the production, but you must consider also that all of these persons are interested keenly in the supply and source of their fuel. This particularly manifests itself at the present time when interruptions to that supply are being experienced through lack of car supply, and when apprehension is felt in some circles that there may be some trouble at the source, if the wage negotiations fail of result."

RADIUM METAL HAS BEEN ISOLATED ONLY TWICE

Radium is a metal and is described as having a white metallic luster. It has been isolated only twice. Radium is ordinarily obtained from its ores in the form of hydrous sulphate, chloride or bromide, and it is in the form of these salts that it is usually sold and used. These are all white or nearly white substances, whose appearance is no more remarkable than that of common salt or baking powder.

Radium is found in nature in such exceedingly small quantities that it is never visible even when the material is examined with a microscope. Ordinary radium ore carries only a small fraction of a grain per ton of material and radium will never be found in large quantity, because it is formed by the decay of uranium, a process which is wonderfully slow, and radium itself decays and changes to other elements so rapidly that it is impossible for it to accumulate naturally in visible masses.

Minerals which carry radium are fairly easy to determine. Pitchblende, as generally found, is a black mineral about as heavy as ordinary iron, but much softer. The principal radium mineral, carnotite, has a bright canary yellow color, and is generally powdery. There are other radium-bearing minerals of less importance.

ASSOCIATED GEOLOGISTS OPEN A NEW YORK CITY OFFICE

The Managing Geologists of the Associated Geological Engineers announce the opening of a New York office at 3112 Equitable Building, 120 Broadway, in charge of Frederick G. Clapp, Managing Geologist of Petroleum Division. They will continue the practice of Geological Engineering in all its branches, with special reference to examinations and reports on oil and gas properties.

The present staff of geologists and engineers will be maintained, with additional equipment and facilities.

The Managing Geologists and their associates desire at this time to express to their clients an appreciation of the confidence and patronage so liberally accorded in the past.

ZINC OUTPUT OF NORTHERN ARKANSAS LIKELY TO DOUBLE THIS YEAR

Carbonate Ore Being Extracted From Scores of Small Properties—Railroad Being Built From Rush Creek to Yellville Will End Troublesome Transportation Problem—Four Ore-Buying Companies Operating in District

With the advance in zinc prices great prosperity has come to Marion, Boone, Newton, Searcey and Orange Counties, in Northern Arkansas. The mining of zinc carbonates in this region has resulted in the greatest activity. For the most part work is being done by small operators. Some of the ore is being removed from open cuts and a great deal is available from short tunnels.

Reports reaching Washington indicate that mining in this portion of Arkansas during the first three months of 1916 shows a remarkable increase over the same period of 1915.

The livest camp is Rush Creek, which is twelve miles southwest of Yellville. A narrow-gauge railroad is being built from Rush Creek to Yellville. This railroad will remove the principal drawback to mining in this territory. The lack of transportation facilities has been such as to make a cost of $3 a ton necessary to get the concentrates to the railroad. At times the condition of the wagon roads has been so bad as to make it absolutely impossible to ship ore.

Another great advantage that will come with the completion of the railroad will be the possibility of introducing coal and oil for fuel at the smelting plants. Wood has been the fuel used in the past and at times it was more difficult to get fuel than ore.

In September, 1914, there were less than 100 people in Rush Creek. The town has now fully 1,000 inhabitants, it is reported.

From all appearances the output of zinc in Arkansas will double in 1916. There was one mill in operation in Arkansas in 1914; ten in 1915, and seven mills are now building or have just been completed. Formerly there was only one company buying ores in this part of the zinc belt. Now there are four companies bidding for the carbonate.

General prosperity has resulted in great improvements in roads and is making possible important experiments in the use of important metallurgical processes.

The mining of zinc in Arkansas received a severe setback in 1907. A boom at that time resulted in financing a considerable number of properties. In many cases poor judgment was used and expensive surface improvements were made before the value of the deposits had been determined. High overhead charge made profits impossible. As a result these failures gave the industry a bad name in that section and very effectually shut out additional capital. The increasing demand for zinc, however, lead to further development of mines on these properties and it has proven that they are much more valuable than it was formerly thought.

Bureau of Mines Publications

The Bureau of Mines will have ready for distribution April 1 the following publications:

Bulletin 86. Some engineering problems of the Panama Canal in their relation to geology and topography, by Donald F. MacDonald. 1915. 86 pp., 29 pls., 9 figs.

Bulletin 89. Economic methods of utilizing Western lignites, by E. J. Babcock. 1915. 74 pp., 5 pls., 5 figs.

Bulletin 114. The manufacture of gasoline and benzene-toluene from petroleum and hydrocarbons. 1915. 268 pp., 9 pls., 45 figs.

Technical Paper 93. Graphic studies of ultimate analyses of coals, by Oliver C. Ralston, with a preface by Horace C. Porter. 1915. 41 pp., 3 pls., 6 figs.

Technical Paper 129. Metal-mine accidents in the United States during the calendar year 1914, compiled by Albert H. Fay. 1915. 96 pp., 3 figs.

Miners' Circular 20. How a miner can avoid some dangerous diseases, by A. J. Lanza and Joseph H. White. 1915. 24 pp., 4 figs.

LITERATURE ON FLOTATION PROCESS IS ABSTRACTED

Officials at the Bureau of Mines are finding the bibliography on concentration of ores by flotation, issued recently by the School of Mining and Metallurgy of Missouri, a most useful publication. It is a compilation of all articles on flotation and contains a very convenient index to literature on this subject, and in addition abstracts on all patents applying to flotation are given.

Dorsey A. Lyons, who is in charge of cooperative work being done by the Bureau of Mines and the Missouri School, is planning regular supplements to this publication, which will keep it up to date.

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EDITORIALS

GASOLINE AND COAL PRICES—A COMPARISON

The price of gasoline has doubled in the last six months and predictions are plentiful that its price will continue to advance. This is accounted for by Secretary of the Interior Lane by—

(a) Increased consumption of gasoline within the United States. Various trade journals estimate that the consumption of gasoline in the United States during 1915 was 25 per cent greater than in 1914, and that there will be a like increase in 1916.

(b) Increase in exports.

(c) The depletion of gasoline stocks due to increased domestic and export demands. On January 1, 1915, refiners had stocks of gasoline in storage amounting to at least 2,000,000 barrels. Inquiry today indicates that there is little gasoline in storage.

(d) Decreased production of crude containing a large percentage of gasoline, as in the Cushing pool of Oklahoma, the daily production of which declined from more than 300,000 barrels in April, 1915, to less than 100,000 barrels in January, 1916. The decline in the Cushing pool was partially compensated for by an increased production of crude from other pools, the gasoline content of which production, however, was from 5 to 7 per cent less than that of the Cushing crude.

The following table is given, the totals of domestic consumption being found by deducting the amount exported from the amount produced:

	Production	Exported	Difference
1899 ..	6,680,000	297,000	6,383,000
1904 ..	6,920,000	594,000	6,326,000
1909 ..	12,900,000	1,640,000	11,260,000
1914 ..	34,915,000	5,000,000	29,915,000
1915 ..	41,600,000	6,500,000	35,100,000

No difficulty has been experienced in purchasing sufficient gasoline to meet requirements, and yet the price has advanced 100 per cent. It is difficult to find satisfaction in a comparison of the prices for coal and gasoline when contrasting the two branches of the industry.

The price of coal has made a small increase but the cost of machinery and supplies has materially increased and the labor cost has been increased by a 5 per cent increase in wages, wherein lies the difference?

Are oil producers wise and coal producers otherwise?

Gasoline, for the most part, is a luxury. Coal is always and only a necessity. Does the public yield willingly for luxury and grudgingly for necessity? Or does it yield when it must and only when it must.

Bituminous coal operators had no difficulty in demonstrating that they could not pay an increase in wages, but they did, and were apparently relieved that the increase was no more.

The public can pay the operator a few cents more for his coal, under the same stress which induced the operators to agree to the recent advance in wages. Gasoline has generally been sold at a profit; bituminous coal has not. Coal consumers can be made to pay a price which would double the amount received

by the producer with no greater protest than was made by gasoline users. That would not be right nor fair, nor is it right or fair, that the coal producer should sell at present prices.

The bituminous coal producers of the country, as a whole, should receive from fifteen to twenty-five cents per ton more for coal than the average price for the last six years based on past production costs. With increased costs for labor and supplies the twenty-five cents per ton increase will not more than put the industry on a fairly paying basis.

It is a startling anomoly that the producers of a necessity shall continue to operate at a loss. If they were wise they would devise a remedy for conditions generally regarded as intolerable.

BUREAU OF MINES SHOULD CONTINUE ITS SAFETY WORK

Here are the more important reasons why House Bill 153 should be so amended as not to interfere with the work now being done by the Bureau of Mines. The bill would place a portion of the work now being done by the Bureau of Mines under the jurisdiction of the Department of Labor.

The first thing to be considered is the reduction of accidents, which is the purpose of the bill under consideration. The record of reduction in loss of life in mining operations since 1907, when the first appropriation of $150,000 was made "for conducting such investigations as would increase safety and efficiency in mining," is remarkable.

These good results have been obtained by a practically perfect cooperation between mine operators and workers, each of whom has full confidence and respect in the work of the Bureau of Mines. To take the control of this work from that Bureau might easily destroy this relationship of confidence and cooperation, which we believe to be ab-absolutely essential to the best results.

The bill as it passed the House apparently leaves both the Bureau of Mines and the proposed Bureau of Labor Safety with authority to make the investigations, but when taken in connection with the wording of an appropriation for the Bureau of Mines to the general effect that the money appropriated shall not be used to perform any work which any other bureau is authorized to do, would probably prevent the Bureau of Mines from any activity in this behalf, leaving all of this work to be done by the proposed Bureau of Labor Safety.

It is particularly desirable that there shall be no duplication of this safety work, and it would be unfortunate to have this legislation appear to leave any doubt as to which of these bureaus should make the investigations looking to better conditions in the mines of the country.

The American Mining Congress believes the following amendment would meet the situation:

> "except that investigations and examinations of labor safety plans and devices, and the study of devices and methods for the prevention of diseases, in the mining, quarrying, metallurgical, and other mineral industries, shall be made by the Bureau of Mines, as required by existing law."

Thus amended, the bill will not interfere with the splendid work which the Bureau of Mines has been and is doing for the benefit of the underground toiler in the mines of the country.

MINING DESERVES MORE AID FROM GOVERNMENT

The following official statement given out recently by the Arizona State Bureau of Mines is a concise rendering of one of the gospels which the American Mining Congress is trying to teach:

"There is a great necessity for men engaged in the mining industry to be more familiar with political affars, especially conditions in Washington and in their State capitals, is the statement recently made in a bulletin of the Arizona State Bureau of Mines. That this has not been the case is in no small degree responsible for the unfair distribution of government funds regarding mining and agriculture.

"Agriculture and mining are the two backbone industries of the country, and

each deserves fostering by the federal and State governments. More money could profitably be spent in the agricultural development of the country and more undoubtedly will be spent; it is quite probable that in a few years the size of agricultural appropriations will have doubled their present size.

"The same is true of mining. The mines in the country as a whole produce almost as much new wealth as agriculture, and in many States, such as Arizona, the mines produce annually as much as the total value of all farm land, improvements and products. If anything, mining should receive more aid from the government than is given to agriculture, as it is more scientific, and results are obtained only after long and expensive experimentation. Moreover, that which is taken from mines is removed forever, and there is no opportunity of correcting mistakes, whereas on a farm a mistake in one year's crop may be corrected in the next.

"Mining is not receiving its fair proportion of government and State appropriations, and it is largely the fault of those in the mining industry, for they have not given the coordinate action of the persistent type which the farmers have. Cooperation and organization will be the means by which the miner will receive his share of attention."

COUNTRY TO HAVE CHANCE TO SEE SAFETY-FIRST SHOW

We do not want to take to ourselves any undue credit, but we are very pleased to announce that the safety-first train, which we urged editorially in our last issue, is an accomplished fact. It may have been that the advantages to be gained were as apparent to the government officials as they were to us. At any rate the country is to have a chance to see the safety-first exhibits which attracted so much attention in Washington.

It will pay any person interested in increased efficiency in the proper safeguarding of human life to visit this train if it comes to your city.

SAFETY FIRST AND THE MINERS' UNION

We call especial attention to an article from the pen of Mr. S. A. Driver appearing elsewhere in the issue under the title "Thoughts on Mining Legislation."

The paper carries a number of statements which will be questioned and which are vitally important. THE MINING CONGRESS JOURNAL opens its columns for a concise discussion of this general subject.

Are the following statements true and if true what is the remedy?

"Of the laws which regulate coal mining which apply to the safety of the miner nearly all are aimed at the operator; the liability and duty of the miner to himself and his fellow workmen is overlooked."

"Of every one hundred men killed under ground, a little more than fifty-two are killed by falls of roof and coal. Only a small number of these accidents were unavoidable; nearly all could have been prevented by the exercise of ordinary skill and care and a few moments' labor by the miner by the setting of one prop."

. . . . . .

"The U. M. W. of A. is opposed to any increase of individual responsibility or efficiency. . . . This union has in this country and in England opposed every suggestion for the safety of the miner which involved any extra labor or time on his part. It has resisted the operation of every safety practice the burden and expense of which did not rest on the operator."

. . . . . .

"To attain a reduction of this high death rate, so earnestly desired by operators and mining engineers, we must reach the man at the face; if this cannot be done by education, then by legislation."

The American Mining Congress has felt much satisfaction in the efforts which have been made in the past looking to greater safety in mining operations. It is proud of the record which appeared in the March issue of the Journal.

It believes in publicity and discussion as the most efficient means through which to advance this cause.

We shall hope for an active discussion of the idea presented.

THE LEASING BILLS

For years the American Mining Congress has been contending against the proposed federal leasing system as it applies to the mineral resources of the west. It has urged that such a system will restrict a development; will foster monopoly in the hands of those who had acquired fuel and power resources under the old law; will make difficult the ability of the Rocky Mountain States to live up to their obligations to maintain republican forms of government by keeping beyond the reach of the taxing power a very large part of the property which must be protected and which should pay its just share of the expenses of government, and will exact tribute from these resources in the form of royalties, which is not exacted from the older states.

These and many other reasons have been reiterated and many efforts have been made to unite the west upon some construction policy which would prevent these results.

During these years these resources have been locked up by the withdrawal orders at first issued by the President without lawful authority and afterward legalized by act of Congress. No development was or is possible until some change is made. Few people believe that the defeat of these bills will accomplish anything further than to continue the present stagnation. Nine-tenths of the nation believes that the Federal mismanagement which was responsible for the abuses of the old law can only be remedied by federal management of another kind and under a law based on radically different principles. All agree that the old abuses should not be repeated. The East has devised and is now insisting on the enactment of laws embodying the leasing principle. The West opposes but offers no constructive substitute. The secretary of the American Mining Congress has been outspoken in his opposition to all federal leasing bills. He has not changed his belief as to the injustice and the inexpediency of such legislation. He has frequently urged the governors and commercal bodies of the western states to get together and devise some comprehensive plan to meet this situation.

Two such conventions have been held. The Public Lands Convention, called by the then Governor of Colorado (now U. S. Senator) John F. Shafroth by authority of an act of the Colorado State Legislature, was held at Denver in 1911. A three days' session developed many protests, but no plan of action. In 1915 a conference of governors and their special representatives met at Portland in September.

This session also developed many protests and by a vote of twenty-nine to seven reaffirmed the opposition of the West to the leasing system, but developed no construction plan in that behalf.

If six years of appeal for a construction policy have been without result is it probable that another six years will be more effective? Shall we continue appealing to deaf ears for help, while western development is being strangled, or shall we lend our aid in making the proposed legislation as tolerable as possible? Demonstrations that this legislation as bad as the West believes will justify its repeal, and if experience is to be relied on this will happen before the West has been able to agree upon a fairly constructive substitute.

What should be the position of the Mining Congress?

What do you think about it? A prompt response from our Western members will be welcomed.

CHANGES OF GEOGRAPHIC NAMES CAUSE PROTESTS

Considerable complaint is being heard in Washington with regard to changes being made in names of localities by the Board of Geographic Names. A number of names have been changed in Alaska recently, which has resulted in considerable complaint from residents there.

Many maintain that the people have a right to name the landmarks of their own locality and that these names should not be arbitrarily changed by a board in Washington.

Mineral Land Decisions

The Wasatch Mines Company of Salt Lake City has lost is appeal from the General Land Office.

This is an appeal from a decision of the Commissioner of the General Land Office dated September 22, 1915, holding for cancellation, because the area has been already patented, mineral entry 013291 for the Emma Copper lode claim, survey 5940, situate in Sec. 32, T. 2 S., R. 3 E., S. B. M., Salt Lake City land district, Utah.

This is a case in which the entire area applied for is embraced within the theoretical limits of the patented Highland Chief claim. The Highland Chief claim, survey 81, is represented upon the plat of survey 5940 in two positions. In its position as actually marked, defined and established upon the ground, it is to the north of and entirely outside of the limits of the Emma copper claim here applied for, while in its position as represented upon the plat and described in the field notes of survey 81, it lies wholly within the limits of the Emma copper claim. It further appears that the total area of said Highland Chief claim, as represented by survey 81 and lying within the limits of the Emma copper claim, is entirely covered by other mining claims heretofore patented, which have expressed exclusions of the supposed conflict with said Highland Chief claim. It now appears as a matter of fact that there was no such conflict. The attempted exclusion by those patented claims of this area was therefore without force and effect and the area passed to said claims under their patents.

It is urged in the appeal that the prior patented claims referred to excluded certain specific areas or tracts which may be identified by a reference to the field notes of the surveys of said claims and that these areas remained public lands of the United States subject to appropriation under the mining law. With this the Department does not agree. In the case of United States Mining Company *vs.* Wall (39 L. D., 546), in which there was a situation similar to the one here presented, it was said:

> "As far as either or all of the surveys are concerned the position of each claim and their relative positions must be determined as the claims are defined and established upon the ground, and all errors of description of the position of either claim, and of the conflicts between them, must give way thereto in accordance with the rule in the case of Sinnott *vs.* Jewett (33 L. D., 91). Indeed, it is plainly evident that it was the intention in this case to exclude from the Northern Light claim the actual, and not a theoretical, conflict with the Grizzly."

Upon motion for rehearing in the case above cited, the Department on March 24, 1913, ordered a hearing for the purpose of permitting the protestant company to establish *prima facie* that the amended survey of the Grizzly is coincident and identical with and covers the same tract of ground as was included in and delimited by, the original survey of that claim. It was not, however, the purpose or effect of the decision to overrule the principle laid down in the decision rendered upon appeal. This is indicated by the following expression:

> "It is further contended that the exclusion made in the Northern Light patent is of a tract described by metes and bounds, referable primarily to the lines of that claim alone. With this contention the Department is not prepared to agree. It may be noted that only three points of intersection out of four are given or mentioned either in the patent or in the field notes of the Northern Light survey, and further, that the parallelism of the side lines of the excluded Grizzly claim is not recited or mentioned. On the contrary, the Department is inclined to the view that the situs of the conflict is established and controlled by the loci of the respective conflicting claims as such claims are fixed and determined by their monuments and lines upon the ground and that it is this conflict that was excepted and excluded from the Northern Light patent."

Therefore, the Department holds, since it appears in this case that the total area applied for is represented by the sum of certain expressed exclusions of supposed conflicts with the Highland Chief claim, which conflicts it now appears have no existence in fact, it must be held that the areas represented by these theoretical exclusions passed under the patents to the claims referred to and that there now remains no area subject to appropriation within survey No. 5940 of the Emma copper claim.

The decision appealed from accordingly was affirmed.

PLACER CLAIM DAMAGE

The Secretary of the Interior has made the following decision in the claim for damages filed by Mrs. E. C. Kinney for the flood-

ing of certain placer claims by the Reclamation Service in the Minidoke reclamation project in Idaho. The decision in brief is as follows:

"The mining claim as to which the claimant was in default in the performance of annual assessment work at the date of withdrawal for the construction of irrigation works under the reclamation act does not except the land from the force and effect of the withdrawal."

This decision modifies the decision made previously by the Reclamation Service and by the department.

The department reaches the conclusion that the claimant failed to comply with the requirements of the general mineral laws as to certain property, particularly with reference to the performance of the assessment work. Under the circumstances pertaining to these claims she is not entitled to receive any reward, it is held.

In another of the claims, however, it appears that the annual assessment work was performed as required by law up to the time the land was flooded, and that there were certain improvements made on the claim. At the time of taking over the land the United States found that a portion of the improvements had been removed and the balance had greatly deteriorated in value. The department agrees that the payment of damages on that property in the amount of $1,000 is justified, but on other claims the damage claims were rejected.

REPAYMENT OF EXCESS

An appeal from the decision of the General Land Office by William McGinley in connection with his coal land entry in the Montrose, Colo., land district, has been decided by the department as follows:

"Where the purchaser of coal lands paid the appraised value thereon as required by the departmental regulations, he is not entitled to repayment of any excess paid by him over and above the minimum price fixd by Sction 2347, Revised Statutes."

REFUSES TO LEASE

The decision in the matter of applications for lease on Colorado oil lands presented by Paul Lovell, of Marietta, Ohio, by James H. Causey, Denver, and by James B. Shepard, of Denver, the following decision has been reached:

"In the absence of specific legislation provided therefor, the Secretary of the Interior is without authority to enter into or make leases covering public oil and gas lands."

The form of lease sought was essentially similar to that which was used in connection with the leasing of coal and gas lands belonging to certain Indians in the State of Oklahoma.

The question of leasing oil and gas lands and other non-metalliferous mineral deposits upon the public domain has received considerable study and consideration in the Interior Department. It has been concluded that as the law now stands there is no authority to enter into such leases.

In a bill introduced in the House of Representatives by the second session of the Sixty-third Congress were embodied provisions specifically authorizing the Secretary of the Interior to grant prospecting permits and leases upon coal and gas-bearing lands. Like provisions are contained in H. R. 406, which is pending before the Senate.

NORTHERN PACIFIC CASES

In a series of cases appealed from the General Land Office by the Northern Pacific Railroad Company the following decisions have been handed down:

1. Where the lands selected as indemnity by the Northern Pacific Railroad Company are, prior to the approval of the selection, withdrawn as coal, the company will be required to elect to take patent for the land with reservation of the coal, under Act March 3, 1909, or apply for a hearing to determine whether or not the land is in fact coal in character.

2. Where selection was made by the Northern Pacific Railroad Company prior to the Act of June 22, 1910, the lands theretofore withdrawn as coal, the company will be required to take patent for the land with reservation of the coal, under provision of that act, or apply for a hearing to determine whether or not the land is in fact coal in character.

3. Lands embraced in the coal-land withdrawal made under act of June 25, 1910, are not in effect with the provision of act of June 22, 1910, subject to indemnity selection by the Northern Pacific Railroad Company.

4. In view of the provisions of the act of June 22, 1910, lands classified as coal subsequent to the date of that act, are not subject to indemnity selection by the Northern Pacific Railroad Company.

By the decision of the Commissioner of the General Land Office it was held that inasmuch as these tracts were classified as coal lands before the date of filing the selection, the selection was allowed erroneously and was thereupon rejected.

The railroad appealed to the secretary from this decision. It contended in the support of this appeal that under grant to the railroad company that the act of July 2, 1864, the company is entitled to select land although coal in character. This is based on the statement in the act of 1864 where the word "mineral" in the act "shall not be held to include iron, or coal." This contention is in direct contravention with the language used in the withdrawal under date of October 13, 1906, and upon careful consideration the department is convinced that the railroad company obtained no right to mineral lands by the statute cited.

FOUR PROBLEMS ARE INVOLVED IN APPLYING FLOTATION TO JOPLIN ORES

Quantity of Material Treatable without Further Crushing—Possibility of Regrinding Material—Oils Best Suited for Work and Effect of Acid Waters Must be Considered by Missouri Operators

During the past year the Bureau of Mines has been carrying on mill tests in the Joplin District, Mo., to determine the losses at the lead and zinc mills in the district and the possibility of lessening them. The average recovery of zinc at mills is between 60 and 70 per cent, although recoveries are somewhat higher at some of the better equipped mills.

Clarence A. Wright, of the Bureau of Mines points out the possibilities of treating the ores by flotation, the conditions that must be met, and the problems that must be worked out to insure success on a commercial scale. By flotation is meant all processes in which minerals are separated by being made to float on the surface of a liquid or on a mass of bubbles.

JOPLIN MILLS

In the Joplin District the mills are small, their capacity being 100 to 500 tons of ore in 10 hours. They are equipped with crusher, rolls, jigs and tables. At most of them the material that reaches the jigs is half-inch size. The middlings, locally called "chats," from the jigs are recrushed for further treatment by sand jigs or tables, or, in some mills, returned to the rougher-jigs. Middlings from the tables are seldom recrushed. The first point to be considered, Mr. Wright concludes, is how much material now being produced is fine enough to be amenable to flotation, or, in other words, what percentage of the total tonnage treated is crushed to a suitable size, and what proportion of this size can be saved.

Screen analysis of the total tailings from several mills showed that the percentage of material passing a 65-mesh screen (Tyler standard screen with openings 0.208 mm., or 0.0082 inch in diameter), was 3 to 16.4 per cent, according to the character of the ore and the fineness of crushing, the 16.4 per cent being for a mill treating "soft-ground" ore.

Zinc ores containing a comparatively large proportion of lead and iron sulphides would require preferential flotation (which would have to be worked out) or retreatment of the concentrates on tables. A preliminary treatment of the flotable material on tables to eliminate the lead and iron has been suggested, but would require extra tables, and its efficacy is doubtful.

RETREATMENT

Retreatment of the concentrates on tables seems to be the most feasible method of separating the lead and iron sulphides from the zinc blende, and could be accomplished at small cost by using a small diaphragm pump to return the tailings from the tables to the flotation system, making a closed circuit. This method of retreatment gives satisfactory results in some Western mills. The froth from the concentrates is largely "killed" by spraying it with water, or by some other effective means, before it comes to the table. The ease with which the froth is killed will depend, also, on the oil or oil mixture added to the pulp.

The composition of the gangue in the Joplin district ores differs somewhat and the mineral content varies. Consequently, though many available oils give acceptable results, no one oil or quantity of oil will give the best possible results for all ores, and the best oils or mixture of oils must be determined by experiment.

The Bureau of Mines, in cooperation with the Missouri State Geological Survey, started flotation experiments in the Joplin District in the latter part of the year 1914 and continued them until the spring of 1915.

In the first experiments different oils were tried in varying quantities to determine which oil was best suited to the material treated. When the number of oils had been cut down to three or four, the same tests were repeated with the addition of sulphuric acid in varying quantities. The effect of temperature was then determined.

WOOD OILS BEST

It was found from the preliminary results that the sulphides of this district are apparently not difficult to separate from the gangue by flotation, and that a fairly good grade of concentrate could be obtained by the use of "rougher" and "cleaner" cells. Oils with a tar base gave a high recovery, but a low-grade concentrate carrying a considerable amount of gangue. Other oils gave higher-grade concentrate, but not as good an extraction under the same conditions. The best results were obtained from wood creosote and pine oils.

To verify the data obtained from this preliminary work, slimes produced from one of

the sheet-ground mines near Webb City, Mo., were shipped to Salt Lake City, Utah, where the Bureau of Mines in cooperation with the University of Utah is conducting flotation experiments. The results of the experiments, which were performed by O. C. Ralston and G. L. Allen, of the Bureau of Mines, showed that it is fairly easy to float the sphalerite from the gangue by using warm solutions and about one pound per ton of any suitable oil, either from wood or coal distillation, and that acidity, although it does seem to be necessary, allows the froth and tailings to separate more quickly. Cold solutions gave as high extractions as warm solutions, but the grade of the concentrates was not as high.

A scheme making use of rougher and cleaner units of flotation cells seems essential in order to get a high extraction and concentrates of acceptable grade.

In the experiments made in Joplin, the thickness (ratio of solids to water) of the pulp treated ranged from 1.3 to 1.7. In practice the most favorable ratios for different ores would, of course, have to be determined by experiment.

In general, a mixture of sand and slime requires a denser pulp, whereas for a mixture consisting wholly of slimes (finer than 200-mesh) a thinner pulp is desirable. Thickening of the slimes from the Joplin District mills would be necessary, and could be accomplished by the use of Dorr thickeners or some other device that would give the flotation machines a uniform feed of constant thickness.

The addition of acid may not be absolutely essential for all the ores of the Joplin District, although the local tests showed that a small quantity of acid was of great help, especially in cleaning the concentrates.

CONCLUSIONS

In conclusion, the problems to be solved in applying flotation to the ores in the Joplin District may be summarized as follows: (1) the quantity of material treatable by flotation without further crushing; (2) the possibility of regrinding a part or all of the material; (3) the oils or oil mixtures best suited to the material to be treated; and (4) the effect of the acid waters present in some of the mines of the district. The last two problems can be best solved by setting up a small test machine in each mill.

A flotation process, when worked out, will be of great help in raising the percentage of extraction, but operators should note that a saving is possible at other stages in the concentration of the ores and should investigate these more thoroughly.

To Send Exhibit

The Bureau of Mines will have an exhibition at the Centennial of the State of Mississippi, which will be held at Gulfport early next year.

UTAH COPPER COMPANY LOADS 586 CARS IN A DAY

Perhaps the most noteworthy accomplishment of this era of rapid advance in mining processes and science is the great excavating efficiency that has been achieved by the Utah Copper Company. The biggest month ever had at the mines of the Utah Copper Company was August, 1915, when a total of 1,979,502 tons of waste and ore was mined. "Our steam shovels worked a total of 775 ten-hour shifts during that month, corresponding to an average of 2,554 tons per shovel shift and an average of 63,855 tons of rock per day," says R. C. Gemmell, the general manager of the company.

"The greatest amount of ore that we have even loaded was on July 8, 1915, when a total of 37,724 tons was loaded into 586 railroad cars. The total quantity of capping handled during the month was 1,036,991 tons, corresponding to an average of 33,451 tons daily. Therefore, it may be assumed that on July 8, the total tonnage of ore and waste mined was 71,175.

"All of the material handled at our mines is hard, solid rock, and it has to be blasted. The loading is done by twenty steam shovels, working on as many benches, with the top bench having a vertical elevation of about one-quarter of a mile above the lowest bench. This is an entirely different proposition from that where dredges on the Panama Canal are working on soft, sliding material. Moreover, the capacity of dredges is much greater than of steam shovels."

Faithful Negro Dies

In the passing of Anthony Mason, a negro messenger at the Geological Survey, George Otis Smith, the director, pays him the following tribute:

Born in slavery and remaining a slave until he reached man's estate, he started in life with the disadvantages imposed by such conditions. Clarence King lived at a hotel in New York where Mason was a dining room waiter and thus came to know him. When Mr. King came to Washington as the first director of the newly created Geological Survey he brought Mason with him to act as messenger at the director's door. It thus came about that Mason was one of the first appointees, the date of his appointment being July 8, 1879. From that date until the day of his death, a period of nearly thirty-seven years, with unvarying loyalty and punctuality he served as messenger at the director's door.

By his uniform courtesy, his fidelity and his absolute honesty he won the respect, esteem and warm personal regard of all with whom he came in contact—in an organization numbering nearly 900 persons. Measured by the highest standard this man was a success in life of which he might be justly proud. He leaves behind only kindly memories among troops of friends.

GEMMELL HEADS UTAH COMMISSION TO STUDY WORKMEN'S COMPENSATION

Will Submit Report to Next Session of Legislature—Hartley Gives out Statement in Salt Lake City—Exhibits from San Francisco Exposition Are Being Set up in Mining and Metallurgical Building of University of Utah

By A. G. Mackenkie

Salt Lake City, March 25.—Gov. William Spry, of Utah, has appointed the following as Commissioners to investigate workman's compensation and employers' liabilty and to recommend legislation to the next Utah legislature which meets in January. R. C. Gemmell, general manager of the Utah Copper Company; Don B. Colton, State Senator from Uinta County; Ira R. Browning, State representative from Emery County; H. B. Windsor, President of Windsor & Co., Insurance; LeGrand Young, attorney of Salt Lake; Henry K. Russell, of Salt Lake, and Charles H. Pearson, of Ogden. Messrs. Gemmell and Windsor are named as employers of labor, and Messrs. Russell and Pearson as representatives of labor. The commission which was created by the legislature of 1915 is to submit its report and recommendations sixty days before the next session of the legislature.

Mr. Gemmell is Governor of the Utah Chapter, American Mining Congress.

Carney Hartley, of Denver, chairman of the Committee on Forest Relations of the American Mining Congress, was interviewed at Salt Lake recently, and announced that his committee was doing all it could to encourage the prospector to become familiar with the regulations of the forest reserves in so far as they relate to prospecting. He said a belief was more or less prevalent that prospecting is not permitted on forest reserves, whereas in fact it is not only permitted but prospectors are subjected to only the usual regulations imposed on persons who enter forest reserves.

Mr. Carney said the outlook was for one of the liveliest years in prospecting for a long time past, with a renewed and intelligent interest in metal mining among eastern investors, due to the increased prices of metals. He said it is harder to find a mine in marketable shape in Colorado than it is to find a man to buy it.

The Daly-Judge Mining Company, of Park City, has announced that it will build an electric smelting plant at a cost of $400,000 to handle the zinc product of the company's properties. Two sites for the plant are in consideration, one in Deer Valley and another on the flat below the town of Park City. The project contemplates obtaining power and increased territory through acquisition of the Snake Creek Mining & Tunnel Company, which will give the Daly-Judge more than 2,000 acres of patented ground, extending three miles on the strike of veins, an adequate water supply for power, complete drainage and most advantageous working conditions.

The financing of the new plant will be through an increase of stock of the Daly-Judge which will be offered to present stockholders of the company.

General Manager George W. Lambourne says in connection with the plans that a study of 1915 operations shows that had such a smelter plant been in operation last year and treated the mines' output, earnings would have been more than double.

The Daly-Judge has produced almost 87,000,000 pounds of zinc.

The new plant will be similar to those at the Bully Hill properties in California, at Trail, B. C., and at Anaconda.

UTAH EXHIBIT

The University of Utah has issued the following statement:

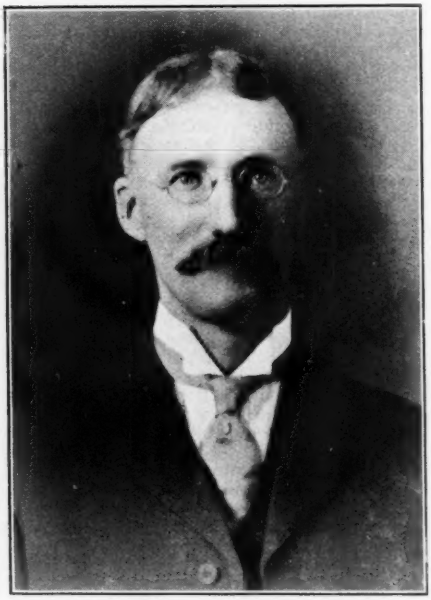
The exhibit of charts and cases of minerals displayed by the Metallurgical Research Department of the University of Utah at the Panama-Pacific International Exposition has arrived at the University and is being set up in the mining and metallurgy building. The exhibit consists of two large plate glass cases containing an educational series of Utah mineral and metallurgical specimens representing the consecutive steps in typical ore dressing and metallurgical proccesses, along with fifteen charts descriptive of the mining and metallurgical resources of the State of Utah.

Although available space is difficult to find in the crowded building, portions of the exhibit are being set up wherever any suitable space can be spared. This display material is directly in line with the work of the mining, metallurgy and metallurgical research departments and will serve as a nucleus for a more comprehensive series of specimens and charts to illustrate the types of minerals and ores and the commercial products possible to obtain from the same, that make up the very extensive mineral resources of the state.

It is the desire of those in charge of the departments to build up a mining and metal-

lurgical museum somewhat after the nature of the exhibit by the U. S. Geological Survey that was on display in the Palace of Mines and Metallurgy at the San Francisco Exposition; entitled "Minerals and Their Uses." In the proposed collection will be shown the principal minerals and ores of Utah along with the product resulting from the commercial treatment of the same, together with the uses to which these minerals and products are applied. The series will make an attractive and highly educational display and will serve to stimulate the ambitious student and interested visitor to lend his efforts toward developing the mineral resources of the State of Utah.

GOVERNMENT EXPERTS WELL KNOWN TO MINING MEN



F. L. RANSOME, GEOLOGIST

Dr. F. L. Ransome was born in Greenwich, England, in 1868. His grandfather was the inventor of an artificial stone which was used extensively in construction at that time. The company, exploiting the patents in the United States, established a factory at San Francisco. Some difficulty was experienced in the manufacturing process and Dr. Ransome's father was sent out from England to straighten the trouble out. The elder Ransome made San Francisco his home thereafter. At the time his parents came to the United States Dr. Ransome was three years of age. He was educated in the public schools of San Francisco and secured his higher education at the University of California. In addition to the regular university course he took three years of post-graduate work and won the degree of Ph.D.

Dr. Ransome took the first set of civil service examinations given by the Geological Survey. George Otis Smith, the present director of the Geological Survey, and Arthur C. Spencer, a geologist still in the Survey service, took this same examination for geologist.

As there was no vacancy in the Survey at that time, young Ransome went to Harvard, where for a year he taught mineralogy and petrology. A vacancy then opened on the Survey, and he began his work as assistant geologist under Dr. G. F. Becker. During the summer vacation, for a number of previous years, he had done some work for the survey and owing to the experience thus gained, he was assigned to work on the mother-lode district of California. In 1900 he was promoted to the rank of geologist and in 1912 was placed in charge of the section of western areal geology. The succeeding year he was given charge of the section of metalliferous deposits, succeeding Waldemar Luidgren.

Principal among the publications of which Dr. Ransome is the author are: Reports on the Globe and Bisbee Districts of Arizona; Silverton, Cripple Creek and Breckenridge Districts of Colorado; Couer d'Alene District of Idaho and Goldfield of Nevada.

Dr. Ransome is a member of the National Academy of Sciences.

Frederick C. Ohm Dies

Frederick C. Ohm, of the United States Geological Survey died in Washington March 14. Mr. Ohm was an expert section maker in the petrographic division of the Survey. He was considered the most able man engaged in this work in the United States. He had been with the Geological Survey since August 14, 1886.

Mr. Ohm was born in Denmark fifty-eight years ago. His father was court photographer to the King of Denmark. He belonged to the Federal Lodge of Masons, and also was a member of the Trowel Club of the Interior Department. He was a leading member of the Bethlehem Chapter of the Order of the Eastern Star.

Water-Supply Paper Issued

Water-Supply Paper 332 has been issued by the U. S. Geological Survey. It deals with the surface water supply of the North Pacific Drainage Basins. It was prepared by Nathan C. Grover, chief hydraulic engineer, F. F. Henshaw, G. C. Baldwin, and W. A. Lamb, district engineers. It was prepared in cooperation with the States of Montana, Idaho, Washington, and Oregon.

THOUGHTS ON MINE LEGISLATION

S. A. Driver, Kitts, Ky.

Someone has said that the future historian will class the present age as distinctly a new age as was the Renaissance. Time alone can prove the truth of this assertion, but it is certainly clear that the duties and responsibilities of the individual are today being greatly lessened, and the functions of the State correspondingly increased. The sturdy self-reliance and rugged independence of the pioneer are passing away, and the present generation is being taught by politicians, press and pulpit to rely upon the community or the State to supply the deficiencies which are due to a lack of individual effort.

The enlargement of the duties and powers of the State is a natural evolution, an evolution so rapid that it is almost revolution, due to the sudden and complex changes in the environment of the life of the present day, and any effort to impair the just powers of the State would be an attempt to turn the hands of the clock backwards. But if the individual fails to discharge his full duty to society the State will in the end become powerless to meet its obligations to the units which compose it.

Man alone, of all organisms, can regulate his environment, and control his evolution, and if society fails to impress upon the individual the value of effort on his part, and the duty of every member, be his station high or low, to bear his part of the general burden, the progress of the race will be arrested, and a period of retrogressive evolution will follow.

Careful study of the laws which regulate coal mining in the different States will show that nearly all sections of the law which apply to the safety of the miner are aimed at the operator; the liability and duty of the miner to himself and his fellow workmen is overlooked. This condition is in entire harmony with the tendency to teach the one that the many must care for him. Hundreds of articles addressed to the operator, superintendent and foreman are every year delivered from the rostrum and appear in the press, all directing them to do more and more for the safety of the employe. Not for an instant should this effort be abated, but how many are directed to the man directly responsible for accidents, and most vitally concerned in their prevention, "the man at the face?"

All men who are sincerely interested in the safety of the miner will fail to discharge their duty to him unless they devote the same time, energy and intelligence to making him fully realize that the burden of his safety is as much his own individual burden as it is that of the operator. The unusual, the abnormal, easily attract attention. Great catastrophies instantly arrest our thought, and set on foot profound researches, but the little things of everyday life, which in the limit are of greater and more vital importance, must be touched by the hand of genius to be seen in their true light, and given their real value, and this truth suggests another thought in connection with mine legislation as applied to accident prevention, which is that it had its inception in the great disasters of the industry: an explosion or fire in a mine flicks out hundreds of lives in an instant; millions of people read the account in the morning papers and a general demand for more stringent mine laws assails the lawmakers. Here it should be said that most operators today cheerfully comply with all laws enacted with fairness and intelligence for the purpose of preventing not only great disasters, but the everyday accident as well, and the few who do not comply should be made to suffer the full penalty.

Of every one hundred men killed under ground; a little more than fifty-two are killed by falls of roof and coal. Only a small number of these accidents were unavoidable; nearly all could have been prevented by the exercise of ordinary skill and care and a few moments' labor by the miner—by the setting of one prop. The failure of the miner to set this prop is very seldom due to lack of knowledge that the prop was needed at that particular spot. It is generally due to carelessness, laziness or greed, greed being defined as unwillingness to take the time from loading when cars are being received in quick succession, or, as the miner expresses it, when the turn is extra good.

When the operator has given the miner a safe way of reaching a working place in an entry, room or pillar, which at the time the miner accepts it, is safe and roof conditions are normal for the mine or district, and sees that the miner's orders for suitable timber are promptly complied with, it would seem that the operator had discharged his duty in protecting the miner from falls of roof and coal, and that by education or legislation the miner should be made to realize that he must do his part like a man and take care of himself.

The policy of multiplying company inspectors and safety bosses is not only becoming a serious financial burden on the operator, but is impairing the efficiency of the miner by making him depend upon another for the protection which he should give himself. Furthermore, the miner, in his work of extracting coal, is constantly changing conditions and creating new dangers and to protect against these would require a safety boss for each working place. Under certain exceptional competitive conditions corporations of great capital can have a staff of inspectors so large that each place which is being worked will be visited by the district inspector at intervals not exceeding three hours, but there are many small operators, conscientious and humane, who give the public some of its best and cheapest coal,

hustling day and night to meet pay rolls with coal sold in keenest competition, who would be forced to close their mines if compelled to follow this policy. If the little fellows are put out of business, the great industrial corporations who now run their mines not for direct profit from the coal, being satisfied with a production cost, which does not exceed the price at which the coal can be bought in the open market, would have to supply the public with coal, they would then no doubt want a profit from the operation of the mine.

When the small operator is put out of business, the big fellow can have a safety boss for every ten men, should the law so require, and let the public foot the bill.

It is now required in some States that the company inspector must not only direct the miner whose sight is as acute, whose ear is as sensitive as his and who knows as well as he that this particular post is needed, to set a post, but must wait and see that the post is set. There is neither justice to the operator nor mercy to the miner in this policy, for it imposes an unnecessary burden on the one and makes the other a careless workman.

When negroes from the cotton fields of Mississippi or Hunkies from the wheatfields of Hungary are first placed in the mine, we even fill and trim their lamps, and they should be given conscientious care, but from the start let him know that you expect him to learn to walk alone, to get out of the kindergarten and take care of himself. We have had the great catastrophy to arouse the mining profession and the public to the necessity of making the employer do his part toward accident prevention, but where is the genius who will awaken them to the even greater necessity of making the miner protect himself? He will not come from the ranks of the union miner, because the U. M. W. of A. is opposed to any increase of individual responsibility or efficiency. Its catechism has no place for the one, and the other is not found in its lexicon. This union has in this country and in England opposed every suggestion for the safety of the miner which involved any extra labor or time on his part. It has resisted the operation of every safety practice the burden and expense of which did not rest on the operator. The cardinal tenet of this union is: "Do less work and get more pay." It constantly demands shorter hours of labor and increase of the daily wage. It does not aim to improve the poor workman—the demand for payment on a mine-run basis is one striking evidence of this—it drags the skilled workman down, and reduces its members to one monotonous level of mediocrity while the consumer foots the bill, or corporations go into bankruptcy. When will the public sit up and take notice?

We need not, therefore, look for this genius in its ranks and we fail at the present to see any signs of him in the ranks of the operators or legislators. We must, therefore, try staff-planning, which may even discount genius. Surely, among the ranks of the various operators' associations, mining congresses, and safety societies are talents, which, combined, can plan a campaign for safety miners, as well as safer mines. The Bureau of Mines was created to investigate and set in operation methods and practices in mining which would protect the life and limb of the miner. The first problem which appealed to it was the prevention of explosions and accident from explosives. The results achieved in this line have more than justified its creation and continuation. The members of this bureau are men of high technical ability, well tried physical courage, and conscientious devotion to duty, men who command confidence and respect. They have made many excellent suggestions to operators, and are constantly setting on foot investigations designed to reduce the death and accident rate. These have, however, usually dealt with accidents due to explosions and the use, or misuse, of explosives. They have given the operator excellent advice on making the mine safer. They might give a little to the miner on making himself safer and induce him to adopt this advice, as have the companies.

During the three years 1910, 1911, 1912, 7,146 men were killed under ground; of this number 3,782 were killed by falls of roof and coal, 1,198 by explosions, 443 by explosives. It is thus shown that of every 100 men killed under ground, fifty-two were killed by falls of roof and coal. To attain a reduction of this high death rate, so earnestly desired by operators and mining engineers, we must reach the man at the face; if this cannot be done by education, then by legislation. The writer freely admits that the solution of this problem of safer miners is beyond his powers, but when we think of the wonderful accomplishments of staff-planning and team work in other fields of human endeavor, we are constrained to believe that a campaign of education and legislation can be planned and executed which will result in safer miners.

Workmens' Compensation Laws furnish another example of the same tendency by placing the entire cost of insurance on the operator. Any law which fails to place upon the miner his fair share of the cost of insurance, is not only an injustice to the employer, but an injury to the miner, for, when he is given insurance without cost to himself, and compensated for accidents which are the direct result of his own carelessness, he most certainly will not become a more careful workmen, and the result of the carelessness too often only begins with himself. A brattice man working for the writer in a state which has no compensation law, observed a man working under a rock which needed a post, and remarked: "Bill, you ought to put a prop under that rock." To this Bill

replied: "Well, if it falls the Company will have to pay the damages anyway."

What will be the effect of free insurance on such men? We know, too, that their name is Legion. The majority of mine operators would welcome any compensation law based on justice, enacted with wisdom, and enforced in accordance with the rule of reason, and any law which does not meet these requirements, will fail to conserve the best interests not only of the mine owner and miner, but of society. Justice to the miner, as the writer knows him, requires it to be said that the miner would not only willingly but gladly bear a part of the cost of insurance, if the ambulance chaser, the walking delegate, and the demagogue had not advised him to the contrary.

It is the belief of the writer that the miner is paid for the extra risk he assumes, or the hazard of his calling, in the higher wages which he receives, as compared with the workman who expends the same daily energy in callings which require as great a degree of skill as mining, and that society is under no greater obligation to insure the miner than other tradesmen or even farmers. Daily we are becoming more and more members of one body, but why is the body under greater obligation to the member which warms it than to the members which feed and clothe it? Granting, however, that civilization has reached a point in its evolution where State insurance of many kinds has become necessary, but we must remember that by divine sanction the treasury of the Temple required the widow's mite. This was for two reasons: First, giving it made her feel a direct interest in the administration of the Temple's finances, and she experienced the satisfaction which comes to all who do their part. The other is—many mites make a talent. This even love unites with reason and justice in requiring the State to make every member, no matter how insignificant or small, to contribute directly to the general fund, and in no branch of the state's activities is this demand stronger than in workman's compensation.

HAS TAKEN INTERESTING PART IN WEST'S DEVELOPMENT

D. M. Riordan, a mining engineer, of San Francisco, was in Washington March 10 and 11.

Mr. Riordan is one of the most interesting characters in mining engineerng work. As a boy he walked across the plains to hunt gold in Nevada and at nineteen years of age was telegraph operator on the railroad running south from Reno, and was in charge of several hundred men cutting wood for the mines.

He is a veteran of the Civil War and is a remarkably well preserved man. After the war he was in charge of the forts in the Southwest during the time of the Indian disturbances and was engaged in the pursuit of Geronimo.

For a considerable time he sawed lumber in the neighborhood of Flagstaff and after two disastrous fires cleared a large sum from his operations. He was in charge of the Standard Mine at Bowdie, California, during its hey-day.

His house was near the mine and he tells that waking up one night and hearing strange sounds coming from the stamping mill he knew something was wrong and that the stamps were not crushing quartz, nor were they striking the mortars. He dressed and went down to the mill and found, he says, that so much gold had been crushed from the rock that the stamps were pounding on it and doing no further crushing.

Mr. Riordan generally carried the bullion from the mines to the express office himself, but for some reason one day he could not go, and delegated another man to carry the treasure. The messenger started with a four-mule team and a short distance from the assay office was held up by highwaymen. Instead of shooting one of the lead mules when the messenger did not stop at his command, they fired at the messenger and killed him. The mules ran away and carried the body of the dead man and the treasure back to the office.

For a time Mr. Riordan acted as Indian Agent for the Navajos in Northern Arizona and gained their confidence to such an extent that whenever they were in trouble they made immediately for his house at Flagstaff. There seems to have been a habit among certain interested parties to get up Indian scares periodically, and at such a time the contractors would make considerable sums selling supplies to the soldiers. On one of these occasions a white man created trouble with an Indian and immediately called for the soldiers, stating that the Navajos were again on a rampage and the settlers were badly in need of help. The Indian in the case immediately made for Mr. Riordan's house at Flagstaff and told him his story. Mr. Riordan wired in his characteristic way to the commissioner of the soldiers about as follows: "The Indian insurrection is in my kitchen eating supper. Do you want him?" The soldiers were not sent.

At the time of the European war, when Americans were stranded in Europe, Mr. Riordan was appointed a special agent of the Treasury to carry funds and see to their distribution among stranded Americans, and to make arrangements for their return.

Mr. Riordan was for years interested in the La Grange mine near Weaverville, Trinity County, Cal. This is one of the largest hydraulic mines in the United States. It has recently changed hands.

FINENESS OF COAL DUST HAS RELATION TO ITS EXPLOSIBILITY

Important Results Being Attained from Experiments by Bureau of Mines at it Pittsburgh Station—Only Small Amount of Very Fine Coal Dust Is Necessary to Propagate an Explosion, Tests Show

A series of tests are being made at the Pittsburgh station of the Bureau of Mines to determine the relation between the fineness of coal dust and the proportion of the different sizes and its explosibility, alone or in mixture with other dusts. Although the series is not yet completed, enough tests have been made to show roughly there is such a relation. The tests seem to indicate that dust larger than 20-mush has little effect in propagating an explosion. Tests have been made on three mixtures of sizes finer than 20-mesh, the mixtures containing 20 per cent, 40 per cent, and about 75 to 85 per cent finer than 200-mesh. Reducing from 85 to 20 per cent the proportion of 200-mesh dust in such mixtures lessen explosibility so much that the percentage of shale required to prevent propagation is reduced from 80 per cent to about 65 per cent for Pittsburgh dust. This reduction in the proportion of shale necessarily seems small when stated as a percentage, but is shown to be considerable when stated in relative quantities; for instance, the amount of shale required with pulverized Pittsburgh coal dust is four times that of the Pittsburgh dust present, whereas, with coal dust having only 20 per cent finer than 200-mesh, twice as much shale as coal dust will prevent propagation. In other words, the ratio of shale to coal dust is reduced from 4.1 to 2.1 when the percentage of 200-mesh coal dust is reduced from 85 to 20.

20-MESH AND FINER

Tests have again shown the surprisingly small amount of coal dust necessary to propagate an explosion. One violent explosion was obtained when there was only 0.3 of a pound of pulverized coal dust per foot of entry. The maximum effect for the experimental mine conditions is reached when the amount of coal dust, mixed sizes finer than 20-mesh, is about four pounds per foot. With more dust explosibility seems lessened, but further tests are needed to determine this point.

COARSE SHALE DUST

A series of tests was made to determine whether shale dust coarser than that previously used (about 95 per cent through a 200-mesh screen) would be satisfactory. Practically all of the coarser shale would pass through a 20-mesh screen, but only about 27 to 30 per cent through a 200-mesh screen. This coarseness had little effect on the quantity necessary to prevent propagation; only about five per cent more shale being needed than when the pulverized shale was used. Curves showing the relations have been prepared and will be submitted to the field men for their information.

BERNICE ANTHRACITE

A series of tests with Bernice, Pa., anthracite showed no propagation until there was more than 2 per cent of gas in the air current.

SHORT-ZONE GALLERY TESTS

Explosibility tests with coarse coal dust and coarse shale dust are being made in the steel gallery at Pittsburgh to determine how such short-zone tests compare with the longer zone tests in the experimental mine. It is thought possible that the explosibility of different coal dusts, as estimated from the analysis can be checked in the steel gallery, so that much smaller shipments of dust will be needed for the mine tests. So far, the results have not been altogether successful, but it is hoped that a satisfactory method can be developed.

SAFETY-FIRST EXHIBITS TO BE DISPLAYED ON TRAIN

It has been decided definitely to send out a train containing the principal exhibits which made up the Safety-First Exposition held recently in Washington. This will give an opportunity to a large number of persons to see this very instructive group of exhibits and will bring home to the public in general the importance attached to the safeguarding of human life by the Federal government.

While the limited space in railway cars is such as to render impossible as complete an exhibit as was shown in Washington, by the twenty-five government bureaus which participated, it will give a very good idea of the exposition which attracted so much attention here.

It is hoped that the cars may be fitted up and ready to start by May 1. It is probable, however, owing to the large amount of work necessary, that it will be June 1 before preparations can be completed.

Latest Mining Patents

Mine Breathing Apparatus. No. 1,176,711. This invention is by William E. Gibbs, of New York, N. Y.

The invention relates to that class of mine-breathing apparatus which supplies an artificial atmosphere to a worker in a poisonous gas and permits the wearer to enter with safety an exploded or burning mine or other inclosure whose the contents are irrespirable.

The object of this invention is to overcome the objectionable features in such apparatus and to produce a breathing apparatus having a maximum degree of safety with a minimum amount of discomfort to the wearer.

Mr. Gibbs considers the following elements of the apparatus to have special advantage over the forms of appartus now in use: The breathing chamber, the purifying or regenerating can or receptacle, the reducing valve and the pressure gauge and in addition, the fact that all of these parts are carried upon the back of the wearer, thus placing the apparatus in a position least inconvenient to the wearer. The breathing chamber is provided with metallic walls which furnish a large radiating surface, thus obviating the need of a special cooling chamber.

One of the objects of the invention is to dispose the absorbing material so that its surface will remain practically constant as it is consumed, to provide free passage for the carbon dioxide past the absorbing material in such maner that the used part will remain securely in place until the whole is consumed.

The invention provides for coating thin wire guaze sheets with fused cuastic soda or other suitable carbon dioxid absorbing material so that the sheets support and strengthen the plates while in use. Several such plates are placed vertically and parallel to each other in the path of the carbon dioxide which is to be absorbed, the plates being spaced a sufficient distance apart to permit the free flow of the expired air there-between.

REFINING OF PEAT

Apparatus for obtaining the products of Peat. No. 1,175,919. This invention is by Ellis Bartholomew, of Toledo, Ohio, and is assigned to the National Peat Refining Company, of Cleveland, Ohio.

This invention relates to apparatus for extracting the commercial by-products contained in peat, and in providing a means for evaporating and purifying certain hydrocarbons such as are derived from peat.

The invention has lobe-shaped portions located one above the other and communicating with each other. Electrically heated rods are located above and at the lower end of each of the portions.

CONTROLS FEEDING

Mining Machine. No. 1,173,179. This invention is by Frank Cartlidge, of Terre Haute, Ind.

The invention relates particularly to that class of mining machinery wherein cutter blades are carried by a power-driven endless chain, the chain referred to is movable transversely to feed the cutter blades into the material being mined.

The objects of the invention are to provide an effective means for controlling the feeding of a mining machine. It also provides means for varying the angle between the cutter chain and the body of the machine to suit varying conditions. Provision is made for disconnecting the cutter chain from its operating mechanism.

LUBRICATION IMPROVEMENT

Mine Car Wheel and Bearing.. No. 1,173,218. This invention is by James J. Roby, of Cleveland, Ohio.

The invention relates to a mine car wheel and bearing of improved construction. The primary object is to provide a wheel and bearing which will permit of lubrication from a distant source of supply of the lubricant. It also provides wearing parts which are capable of being removed and in which repairs can be made easily.

COOLS QUICKLY

Cooling Ores. No. 1,173,273. This invention is by William H. Hubbard, Jr., of Newark, New Jersey. It is assigned to The Ohio and Colorado Smelting and Refining Co., of Denver, Colo.

The invention relates to the cooling of ores from metallurgical or other furnaces. For instance, it may be applied to the pre-roasting furnace of the Godfrey type, when the product is to be treated further on Dwight & Lloyd machines or the like. The idea is to effect the cooling quickly and cheaply, and at the same time avoid dust and smoke and bring the ore into good physical condition for easy handling and further roasting.

IMPROVES LAMP

Miners' Safety Lamp. No. 1,176,423. This invention is by William Best, of Morley, England.

The invention relates to oil-illuminated miners' safety lamps of the shielded type, wherein the upper part of the lamp frame is fitted with a cylindrical metallic shield or bonnet inclosing the lamp gauze.

The object of the invention is to provide means whereby the upper body portion of the lamp and also its carrying hook shall be rendered capable of being taken hold of by the hand without discomfort to the user.

SEPARATION OF SKIMMINGS

Process of Treating Aluminum Skimmings, Screenings, Slags or other Materials. No. 1,176,272. This invention is by Paul R. Hersman, of Milwaukee, Wis. It is assigned to William Jobbins, of Aurora, Ill.

This process provides for separating the skimmings from the larger pieces of metal occurring with them. The residue is washed with water and the water separated from the undissolved portions of the skimmings. The solid portion is treated with hot sulphuric acid. The dissolved copper is separated by precipitation methods. The purified sulphate of aluminum liquor is evaporated to such density that upon cooling it crystallizes to form aluminum sulphate.

SEPARATES ORES

Ore-Separating Apparatus. No. 1,173,498. This invention is by Riley D. Fassett, of Denver. It is assigned to the Gold Dust Concentration Co., of Denver.

The apparatus comprises a washing or vibrating table. The vibrations are lateral and the table may be inclined both transversely and longitudinally.

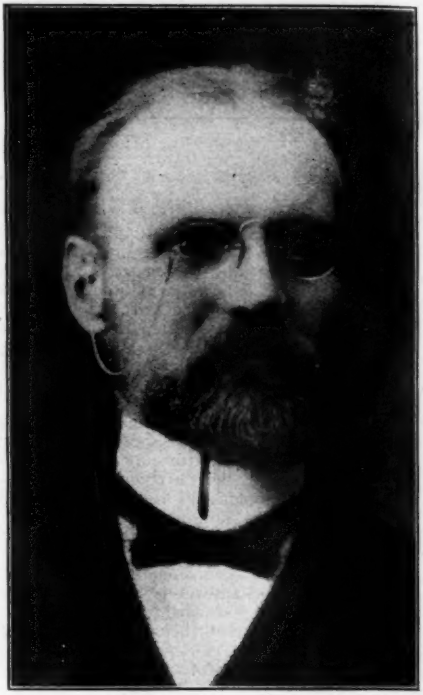
Methods for the manufacture of Chlorates and Perchlorates of Alkali Metals. No. 1,173,346. This invention is by Arthur E. Gibbs, of Wayne, Pa.

The electrolytic part of the method takes place in a cell such as is used for the production of alkali and chlorin. The chlorin produced is removed from the anode compartment before combination with alkali takes place. Some or all of the chlorate and chloride formed from this combination is returned to the anode compartment of the cell and is allowed to pass through to the cathode compartment when it again becomes strongly alkalin and is ready to absorb more chlorin thereby increasing its chlorate content. The chlorate is separated afterward.

WILL WORK UP LOT OF COLORADO PITCHBLENDE ORE

The National Radium Institute has entered into a cooperative agreement with the Colorado & Gilpin County Gold & Radium Mining Company to work up, on an experimental basis, the pitchblende ore mined some two years ago from the German, Belcher & Wood mines, located on Quartz Hill, Gilpin County, Colorado.

The pitchblende ore, consisting chiefly of low grade material, has been shipped to the concentrating mill at the Colorado School of Mines at Golden, where it will be concentrated. The ore consists of four carloads of low-grade ore, some 920 pounds of high-grade concentrates and 11,906 pounds of pitchblende, supposed to run somewhere around 20 per cent uranium oxide. On concentration of the low-grade ore, the concentrates will be worked up in the plant of the National Radium Institute at Denver.



PROF. J. M. ROBERTS
Who occupies the chair of safety engineering at the Colorado School of Mines.

No definite estimates can be made at this time of the output of radium for the ore has not yet been accurately sampled and analyzed. According to preliminary estimates made by the owners of the ore, the whole contains something less than 6,000 pounds of uranium oxide. The extraction of the radium and the development of methods for treating pitchblende will be under the direction of the experts of the Bureau of Mines, and it is hoped to develop methods which can be used for the extraction of radium from pitchblende which are equal to those used in the extraction of this same element from carnotite.

By the agreement with the National Radium Institute the radium extracted is to be used entirely for philanthropic or scientific purposes and is not for sale. The uranium oxide extracted will become the property of the Bureau of Mines to be used in experimental work.

TO ACQUAINT PROSPECTORS WITH REGULATIONS OF THE FEDERAL FOREST SERVICE

Chairman Hartley, of Forest Relations Committee of American Mining Congress, Submits Important Report by His Committee—Fostering of Mining Industry in Sections Now Avoided by Prospectors Is Plan

So much misunderstanding has resulted from the regulations of the Forest Service governing prospecting in national forests that the Forest Relations Committee of the American Mining Congress has decided to undertake a general campaign to make these regulations clear and to encourage prospecting in national forests. The following report has just been made by Carney Hartley, the chairman of this committee:

With a very optimistic feeling in the mining industry, with the price of all the metals at a high stage and a better appreciation of the industry by the investing public, it is reasonable to expect that during the coming season there will be a marked revival in prospecting. In some quarters, at least, there is a misapprehension of the rules regarding prospecting on forest reserves and it may be stated almost as a general situation that the attitude of the Forest Service is not well understood by the majority of people who are interested.

Broadly speaking, the same condition holds for prospecting on the forest reserves as on any public land, but rules are laid down by the Forest Service for the preservation of timber and as regards fires and such like and these must be observed as well by the prospector as by any casual visitor.

This is the only limitation which is imposed, and the committee on Forestry Relations of the American Mining Congress is endeavoring to render a service in making the situation plain to the prospector and in case of any difficulty with the local forest officials, to do everything it can in adjusting them.

The prime object of this work is, of course, to foster the mining industry by furnishing to prospectors information regarding the rules of the Forest Service and to make this as definite and conclusive as possible; to try and adjust differences which have already arisen by taking up the case with the headquarters in Denver and if necessary with the Chief Forester in Washington.

This Committee will not do any legal work but will use every consistent endeavor to carry out the work outlined upon receipt of a statement of the facts of the case, which it should always be remembered, will have to meet a similar statement made by the local forest official.

It would appear to the Committee that its best results can be reached by furnishing information in advance of any work, so that parties going on a reserve may be fully informed of what they may or may not do. It would, therefore, urge intending prospectors to take up the question at as early a date as possible and inform themselves fully so that there may be no difficulties or misunderstanding regarding their rights.

Please bear in mind that the Forest Service has headquarters in Denver, making it very convenient to get definite and conclusive information, as the Committee headquarters is likewise there.

It is hoped that this information will be generally passed along, as it is obviously impossible to reach the individual.

VALUABLE RECORD BEING MADE IN POTASH WORK

There has been no cessation in the determined efforts being made by the United States Geological Survey in its potash work. While the work is naturally painstaking and slow, there is no doubt that much valuable experimentation is being placed on record. Green sand marls are being investigated in different parts of the United States. W. C. Phelan, of the Geological Survey, just has completed investigations of marls in New Jersey and Delaware. He took numerous samples of the deposits and finds them exceedingly well located with regard to transportation and market.

Of course, the big question to solve is whether the potash content can be extracted profitably. These marls also contain potash and lime. They have been used as fertilizer in the states where they occur for many years. It is probable that the potash content, as well as the phosphate, is slowly soluble. The cost of extracting potash from silicates, however, is high and much depends on the mechanical treatment that may be devised.

Green sand marls have been given very little attention as a source of potash and the experimentation is being watched with great interest by chemists throughout the country.

INCREASING IMPORTANCE OF MOLYBDENUM ORES

(Continued from page 159)

PRICES AND MARKETS

Prices: Under existing abnormal market conditions it is impossible to quote exact prices for either molybdenite or wulfenite concentrates, sales of even one or two ton lots being generally the subject of separate negotiations and the prices received varying between wide limits. Based on a content of 90 per cent MoS_2, small lots of molybdenite in 1915 brought from $2,500 to $3,000 per short ton, or from $27.78 to $33.33 per 20-pound unit of MoS_2. Probably from 100 to 200 tons of wulfenite concentrates of domestic origin were sold during the year. Based on a content of 20 per cent MoO_3, the price received was reported to range from $216 to $300 per ton, or $10.80 to $15.00 per 20-pound unit of MoO_3.

At present (March, 1916), the prices offered for molybdenite are about $20 per unit MoS_2, based on a content of 50 per cent MoS_2. For each per cent above or below this, 20 cents per unit may be added or deducted from the price. For example, a concentrate containing 72 per cent MoS_2 would be worth $20 + (22 \times \$20)$ or $24.40 per unt and ore containing 31 per cent. MoS_2 would be worth $20—(19 x $20) or $16.20 per unit. Prices for wulfenite and molybdenite have more than trebled in the last three years, and are at present altogether exceptional. In 1908 high-grade molybdenite concentrates containing from 90 to 95 per cent. MoS_2 brought $6.50 to $7.60 per unit, and in 1909 the price was as low as $5.60 per unit. With increased production and a more normal market the prices are sure to decline. In the past they have been normal at $6 to $10 per unit for 90 per cent MoS_2. In September, 1915, the Australian Government fixed by law the maximum price for high-grade molybdenite concentrates at 105 shillings per unit (22.4 pounds), which is equivalent to about $22.81 per unit (20 pounds). In March, 1916, English quotations on ferro-molybdenum containing from 70 to 80 per cent molybdenum were about 15/6d., or $3.77, per pound.

How Molybdenum Concentrates are Bought and Sold: The basis upon which molybdenum ores and concentrates are bought and sold varies according to whether the contained molybdenum mineral is molydbdenite or wulfenite. Molybdenite products are invariably purchased on the basis of their molybdenum content, reckoned as MoS_2, whereas wulfenite is bought either on the basis of its content of metallic molybdenum, or as MoO_3.

One part by weight of MoS_2 is equivalent to 0.9 part of MoO_3 and 0.6 part of Mo; inversely, one part by weight of Mo is equivalent to 1.5 parts of MoO_3 and 1.67 parts of MoS_2.

In the United States the short ton of 2,000 pounds and the unit of 20 pounds are used in buying and selling molybdenum ore, whereas in Europe, the long ton of 2,240 pounds and a unit of 22.4 pounds are generally used. Quotations are usually made on a sliding scale to cover various grades of material. Specifications generally state the minimum percentage of MoS_2, MoO_3 or Mo in the ore or concentrates that is acceptable, and also the maximum allowable percentage of objectionable elements, such as copper, tungsten, bismuth, arsenic, and antimony. Just what are objectionable elements depends largely on the use to which the molybdenum product derived from the material is destined, and the methods employed in treating it. Copper is particularly undesirable, and more than 2 or 3 per cent of it usually renders even high-grade material unmarketable.

Up to 1914 it was difficult to sell molybdenite concentrates containing less than 80 per cent MoS_2 or wulfenite concentrates with less than 25 per cent MoO_3, but at present, March, 1916, it is reported that concentrates containing as low as 20 per cent MoS_2 and 18 per cent MoO_3 respectively, can be marketed.

TREATMENT OF ORES

Concentration: Of the two commercial ores of molybdenum, namely, molybdenite and wulfenite ores, the first are not amendable to the ordinary processes of concentration by jigs, tables, vanners, etc., such as are usually employed in treating ores of copper, lead, zinc, gold and silver, as the grains or flakes of molybdenite, even when of considerable size, float readily on water, and therefore are lost if these methods are employed. On the other hand, little difficulty is experienced in the adaptation of the ordinary jig and table processes to wulfenite ores, as wulfenite is readily wetted, and because of its high specific gravity (6.7 to 7), it is much heavier than the gangue minerals which accompany it.

Concentration of Molybdenite Ores: The methods of concentration that have been used with success with molybdenite ores may be grouped into three general heads, as follows:

1. Rolling and screening processes.
2. Electrostatic methods.
3. Flotation processes.

Rolling and Screening Processes: Rolling and screening processes consist of crushing the ore in rolls to flatten the molybdenite masses into flakes, the maximum diameters of which are in excess of those of the particles of the accompanying gangue mineral, and then separating them from the gangue by screening. The process is, of course, applicable only to ores in which the molybdenite occurs in fairly large masses and flakes, and even with this type of ore the fines are generally treated either by electrostatic of flotation methods.

Electrostatic Processes: Electrostatic processes of separation depend upon the difference in conductivity between minerals which are relatively good conductors, such as

molybdenite, calcopyrite, pyrite, pyrrhotite, etc., and poor conductors, such as quartz, feldspar and most silicates, calcite, etc. For the successful application of electrostatic methods a molybdenite ore must be one in which the individual particles of molybdenite are of fair size and in which the gangue and other principal associated minerals are nonconductors. The main requisite in the treatment of the ore is that it be perfectly dry and warm. Ore as coarse as 6-mesh and as fine as 200-mesh may be treated successfully, but the best results are usually obtained with coarse material.

Flotation Processes: Molybdenite has the property, common in a varying degree to most metallic sulphides, such as chalcopyrite, sphalerite, galena and pyrite, of not being wetted readily by water, and when dry and in small particles, of floating on a water surface. Moreover, like these sulphides it is easily wetted by most oils; further in a pulp of crushed ore and water oils have a preferential action for particles of molybdenite, as against most particles of gangue minerals, such as quartz, and this selective wetting action is decidedly increased if the water is slightly acidified. Particles of molybdenite so wetted with oil are covered with a buoyant water-repelling coating that materially assists their flotation.

The reasons for many of these phenomena are not clearly understood, but they are the basis of all commercial flotation processes. In many of the oil processes the area of the effective surface of flotation is increased by the liberation of bubbles of gas or air in the liquid, the surface of each bubble acting in the same way as the horizontal surface of a liquid at rest. These bubbles may be of air, and may be produced by violent agitation of the pulp, or by releasing the air from solution in the liquid by a reduction of pressure, or they may be of carbonic acid gas formed by the action of sulphuric acid on limestone or other carbonates or by other means. No description of any particular flotation process will be given here. It suffices to say that flotation processes in general have a wider range of application in the concentration of molybdenite ores than either rolling and screening or electrostatic processes, and it is by means of flotation that the most successful work is being done at present in the concentration of molybdenite ores.

Concentration of Wulfenite Ores: As already stated, the treatment of wulfenite ores presents few difficulties. As even the finest particles of wulfenite are readily wetted, the sliming of the ore does not occasion the considerable losses that would occur under similar circumstances in the treatment of most metallic suphides such as galena and calcopyrite, as these minerals float readily when finely divided. On account of the high specific gravity of wulfenite, it is readily separated from all of the gangue minerals with which it occurs. However, it is frequently associated with vanadinite (specic gravity 6.66 to 7.23) from which it cannot be separated by wet methods; also with cerussite (specific gravity 6.46 to 6.57) and anglesite (specific gravity 6.12 to 6.39) from which it can be only partly separated. Occasionally other lead minerals of high specific gravity, such as galena, pyromorphite and mimetite occur with wolfenite, and are recovered with it in the concentrates. The presence or absence of these other heavy minerals in the ore determines largely the grade of wulfenite concentrates that can be made.

STREAM DATA IN DEMAND AS WATER POWER DEVELOPS

Water in surface streams has at all times played an important rôle in the industrial and commercial development of the country. In the early settlement the rivers served not only as the principal means of communication and commerce, but also furnished power for grinding grain, carding wool, manufacturing lumber and for other industries. They also furnished a medium for transporting logs from the forest to the mills.

With the increased population and corresponding increase in commercial development came the need for better facilities for transportation and more power for industrial uses. Later came a demand for the use of water in streams for municipal supply and for irrigation, and it was found that a systematic study of the water resources of the country was necessary in order that works which depend for their success on the water in streams could be economically designed and operated.

As a result of this demand for data in regard to water resources of the country the U. S. Geological Survey started, about 25 years ago, systematic investigations of streams in order to determine their flow and obtain other information necessary for their economical development, and as a result of these investigations general information is available for practically all parts of the country.

The data collected by the U. S. Geological Survey have been used by the engineer, not only as a basis for the design of power plants, irrigation projects, municipal water supplies, and other works, but have also served as a basis for the economical operation of these works.

With the improvement of electrical transmission it became no longer necessary to use the power at the place of its generation and consequently a demand was created for data in regard to streams available for power at places far remote from where it is used.

Current Federal Legislation

To March 29, 19,111 bills have been introduced in Congress. Of this number, 5,291 are Senate bills, the remaining 13,820 are House bills.

Of the bills referred to in our last issue H. R. 153 is still under consideration by the Senate Commission on Education and Labor. Senator Martine, of New Jersey, has been chosen chairman of the committee, which will investigate the proposed bureau of labor safety in the Department of Labor.

The oil land leasing bill had not been reported out March 28, but the committee has agreed to report the bill favorably and its presentation to the Senate is simply a matter of parliamentary opportunity.

Before the committee agreed on reporting the bill very determined opposition developed to the amendment submitted by Senator Pittman, of Nevada. At first the amendment was embodied in the committee bill without opposition. Investigation proved, however, that the amendment was aimed solely at the Ferry Lake oil land tract in Louisiana. This land is now the source of contest between the federal government and that of the state of Louisiana.

After the committee had spent several days in hearing the respective arguments in regard to this affair it was decided to exclude the Pittman amendment from the bill and consider the matter further. If the committee, after its deliberations, should decide that the amendment is meritorious it will be introduced in the Senate as a committee amendment to the bill.

The House Committee on Mines and Mining is about to begin consideration of several bills pending before it. Chairman Foster is very anxious to secure as great a volume of opinion as possible in regard to the bill which he introduced providing for certain changes in the mining laws. Representative Taylor comments on this bill in another column.

Senate Bills

S. 43, relates to the location, entry and patenting of lands within the former Uncompahgre Indian Reservation in the State of Utah, containing gilsonite or other like substances.

This bill provides that lands and also the minerals therein, which were specifically reserved for future action of Congress, and the remainder of the lands within even numbered sections, containing gilsonite, asphaltum, elaterite, etc., which were, by the Act of March 3, 1903, authorized to be sold and disposed of in tracts not exceeding forty acres, shall, unless otherwise reserved, be immediately open to settlement, location, occupation and entry under all the land laws of the United States, according to the character of the lands or of the mineral deposits.

This bill passed the Senate March 9, 1916.

S. 1064 passed the Senate March 9, 1916, and referred to the Committee on Public Lands.

This bill provides for the non-mineral entry of lands withdrawn, classified, or reported as containing coal, phosphate, nitrate, potash, oil, gas, or asphaltic minerals in Alaska, reserving to the United States the right to prospect for, mine and remove such minerals as may be found upon the land.

S. 4825, by Mr. Owen, providing for the sale of the coal and asphalt deposits in the segregated mineral land in the Choctaw and Chickashaw Nations of Oklahoma. This bill provides that all coal and asphalt deposits leased or unleased in the segregated mineral land in this reservation, shall within six months after the passage of the act, be offered for sale at public auction and sold separately from the surface, under rules and regulations to be prescribed by the Secretary of the Interior, and approved by the President. The bill provides that the sale of such deposits be thoroughly advertised, and offered for sale in tracts of not less than 960 acres, and requires that 20 per cent of the purchase price shall be paid in cash and the remainder paid in four equal payments from the date of sale, all deferred payments bearing interest of 5 per cent, which shall become due before the expiration of four years after the first sale. The bill also provides for the appropriation of $35,000 out of the Choctaw and Chickasaw funds in the Treasury, to pay expense of advertisement, and that the proceeds derived from the sales shall be paid into the Treasury of the United States to the credit of the Choctaws and Chickasaws.

S. 4874, by Mr. Newlands. This bill provides for the establishment of experiment stations in engineering and in other branches of the mechanic arts in connection with the colleges established in the several States and Territories under the provision of an act approved July 2, 1862.

This bill proposes the establishment under the direction of the landgrant college in each State or Territory established, experiment stations, which shall conduct original researches to verify experiments and to compile data in engineering and in the other

branches of the mechanic arts, and to conduct researches, investigations, and experiment in connection with the production, transportation, extraction and manufacture of substances utilized in the application of engineering and of other branches of the mechanic arts to industrial pursuits. The bill provides an appropriation of $15,000 per annum to each State and Territorty, to be specially provided for by Congress in the appropriation from year to year.

S. 4882, by Mr. Myers. This bill provides that a board, consisting of the Secretary of War, the Secretary of Agriculture and the Secretary of the Treasury, be created for the purpose of authorizing an investigation by the board of army engineers to determine the water power possibilities of the Flathead power project located on the Flathead River, near Polson, Mont., for the purpose of ascertaining whether the site is suitable for the production of cheap hydroelectric power for the operation of an atmospheric nitrogen plant, of size sufficient to supply the Army and Navy of the United States in time of war with nitric acid for manufacture of explosives. The sum of $25,000, or as much thereof as may be necessary, is appropriated to carry out the provisions of this act.

S. 5216, by Mr. Smith, of South Carolina. This bill authorizes the Secretary of Agriculture to establish, equip and conduct a plant for the manufacture of potash salts from kelp, to such extent as will make possible the ascertainment of the cost of its production in commercial quantities, and the availability of kelp as a source of supply of potash salts. The sum of $150,000 is appropriated to carry out the provisions of the act.

S. 50, by Mr. Smoot. This bill provides for applying a portion of the proceeds of the sales of public lands to the endowment of schools or the Department of Mines and Mining, and to regulate the expenditure thereof. The bill is pending before the Senate Committee on Mines and Mining.

S. 51, by Mr. Smoot, provides for the establishment and maintenance of mining experiments and mining safety stations for making investigations and disseminating information among the employes in mining, quarrying, metallurgical and other mineral industries. The bill is pending before the Senate Committee on Mines and Mining.

S. 52, by Mr. Smoot, provides for a commission to codify and suggest amendments to the general mining laws, has passed the Senate and is before the House Committee on Mines and Mining, where the majority of the committee is in favor of reporting it unfavorable to the House.

S. 725, by Mr. Warren. This bill provides for mining experiment stations in Wyoming. The bill is before the Mines and Mining Committee of the Senate and the Secretary of the Interior has submitted a report on it. He points out that since the legislation is on the statute books providing for ten mining experiment stations it is not wise to have separate bills providing for other stations.

S. 775, by Mr. Walsh, provides for encouraging prospecting, mining and treatment of radium bearing ores in lands belonging to the United States for the purpose of securing adequate supply of radium for the government and other hospitals of the United States. Since the introduction of the bill an investigation has shown that all radium-bearing ore is already in private hands. Whether the legislation contemplated by this bill would be of value is in question. Until it is determined no action on the bill probably will be taken by the Committee on Mines and Mining.

S. 776. This is by Mr. Walsh and amends Sections 2347, 2348 and 2350 of the Revised Statutes of the United States. The bill has been reported favorably by the Committee on Mines and Mining and is pending on the Senate calendar. The sections in question have to do with the payments for vacant coal lands and rights of entry.

S. 3620, by Mr. Brady. This bill provides for Mine Experiment, Mine Safety and Mine Assay Stations.

S. 4965, by Mr. Sheppard. This bill provides for mining experiment stations in Texas.

These last two bills, as well as other bills providing for experiment stations, are not approved by the Secretary of the Interior owing to legislation already enacted providing for experiment and other stations. It is unlikely that any action will be taken by the committee.

The mining experiment stations authorized at the last session of Congress, could not be established as no appropriation was made for them. It is probable that money to provide the establishment of three of the ten stations authorized will be carried in the sundry civil bill.

S. 1093, by Mr. Owen. This bill gives permission to the Denison Coal Company to relinquish certain lands embraced in the Choctaw and Chickasaw coal lands and to include within the lease other lands within the segregated coal area.

House Bills

H. R. 12426, by Mr. Hayden, authorizes mining for metalliferous minerals on Indian reservations in the State of Arizona. This bill authorizes the Secretary of the Interior to lease to citizens of the United States, or to any association or corporation organized under the laws of the United States, any part of the unallotted lands within any Indian reservation in the State of Arizona, heretofore withdrawn from entry under the mining laws, for the purpose of mining for deposits of gold, silver, copper, and other valuable metalliferous minerals, the leases being irrevocable, except as provided for in this bill, but which may be

declared null and void upon breach of any of their terms. The leases under this act are for a period of fifty years, with the preferential right in the lessee to renew same for successive periods of ten years, upon such reasonable terms and conditions as may be prescribed by the Secretary of the Interior, unless otherwise provided by law at the time of the expiration of such periods. The lessee may, in the discretion of the Secretary of the Interior, be permitted to make written relinquishment of all rights under the lease, and upon acceptance be relieved of all future obligation under the lease.

The Secretary of the Interior is authorized to grant to the lessee the right to use during the life of the lease, a tract of unoccupied land, not exceeding twenty acres, for camp sites, milling, smelting and refining works, and for other purposes connected with and necessary to the proper development and use of the deposits covered by the lease. He also has the right to reserve to the United States the right to lease, sell or otherwise dispose of the surface of the lands embraced within such lease, in so far as the surface is not necessary for the use of the lessee in extracting and removing the deposits.

A royalty of 2 per cent of the gross value of the output of the minerals at the mine shall be paid by the lessee to the United States, for the benefit of the Indians, at the end of each month succeeding that of the extraction of the minerals from the mine, and an annual rental, payable at the date of such lease, and annually thereafter, on the area covered by the lease, at the rate of twenty-five cents per acre for the first year, fifty cents per acre for the second, third, fourth and fifth years, and one dollar per acre for each and every year thereafter during the continuance of the lease, except that such rental for any year shall be credited against the royalties as they accrue for that year. In addition, it is provided that the lessee shall spend not less than $100 per year in development work for each mining claim located or leased. All moneys received from royalties and rentals under the provisions of this act shall be deposited in the United States Treasury to the credit of the Indians, to be used for their education, support and civilization.

H. R. 12841, by Mr. Wickersham, appropriating $750,000 for the further construction and maintenance of military and post roads, bridges and trails in Alaska.

H. R. 12994, by Mr. Carter, of Oklahoma, authorizing the Director of the Bureau of Mines to collect and publish statistics on the production, manufacture and marketing of crude petroleum. The data shall embrace the number of wells drilled, location, log, production, total amount of products, accurate information concerning every well drilled for the purpose of developing petroleum in the United States, and any other information of benefit and value to oil production.

H. R. 12778, by Mr. Britten. This bill provides for a national committee on public works and for the development of water power on navigable streams and on the public lands and the use of public lands in relation thereto and for the development of the rivers and harbors of the United States.

H. R. 12779, by Mr. Britten. This bill provides for an export tax on gasoline. The tax is fixed at 50 cents per gallon. The Commissioner of Internal Revenues is empowered to make all necessary regulations to make effective the provisions of the act.

H. R. 6884, by Mr. Carter, of Oklahoma. This bill authorizes the Secretary of the Interior to adopt resolutions concerning payment of advance royalties on coal leases in the Choctaw and Chickasaw Nations. The bill reads as follows:

"That in all cases where two or more leases of coal or asphalt lands of the Choctaw and Chickasaw Nations, made by the mining trustees of said Choctaw and Chickasaw Nations, pursuant to the authority of Section 29 of an Act of Congress, approved June 28, 1898, entitled 'An act for the protection of the people of the Indian Territory and for other purposes,' are held by the same lessee, the Secretary of the Interior is authorized, in his discretion, to credit and apply the total royalty due upon the aggregate production of all of the said leases so held, the advance royalties, whether already paid or accruing thereunder in the future."

UNUSUALLY SEVERE WINTER REPORTED THROUGHOUT ALASKA

Reports received by the U. S. Geological Survey from Alaska are to the effect that an unusually cold winter has been experienced throughout the Territory. It is said to have been one of the coldest winters on record in the Yukon region.

Owing to the unusually mild winters for several years, it had been claimed in some circles that a change had taken place in the direction of the Japan current, resulting in a permanent climatic change in Alaska. Any theory of this kind, however, is exploded by the unusually severe winter which just has been experienced.

Owing to the unusual amount of ice in the Yukon, the opening of the river will be later this year than usually is the case. The Survey parties hope to be able to descend the river early in June.

The severe cold has extended even to southern Alaska. Juneau has had a winter which has sent the thermometer to fifteen degrees below zero, which is unusually cold for that region. Sitka and Kamchatka have had temperatures as low as seven degrees below zero. This is the coldest winter of any year since 1898 the records at these cities show.

Current Traffic Developments

A decision in favor of the complainants has been handed down by the Interstate Commerce Commission in the case of Weston Dodson & Company, Incorporated, and Charles M. Dodson & Company *vs.* Central Railroad Company of New Jersey.

With regard to the ruling, Chairman McChord made the following statement:

Complainants, Weston Dodson & Company, a corporation, and Charles M. Dodson & Company, a partnership, composed of Charles M. Dodson, the estate of Weston Dodson, deceased, the estate of T. M. Dodson, deceased, the estate of Samuel Adams, deceased, Frank C. Stout, E. L. Bullock, and A. S. Schropp, filed their complaint herein March 28, 1914, in which it is alleged that rates charged by the defendant for the transportation of anthracite coal from the Beaver Brook Colliery and from other collieries in the Lehigh anthracite coal region of Pennsylvania to tidewater at Elizabethport, N. J., for reshipment by water, were unreasonable and unjustly discriminatory, and reparation is asked on shipments moving within two years prior to the date of filing the complaint.

The rates herein stated apply for gross or long ton of 2,240 pounds. The rates paid by complainants which are the subject of this complaint are:

On prepared sizes	$1.55
On pea	1.40
On buckwheat No. 1	1.20
On buckwheat Nos. 2 and 3 and smaller sizes	1.10

Complainants sell coal in direct competition with other operators and dealers who mine or buy from mines in the same general region.

In Meeker & Co. *vs.* Lehigh Valley R. R. Co., 21 I. C. C., 129, the commission prescribed rates over the line of the Lehigh Valley Railroad Company from the Stevens Colliery to tidewater at Perth Amboy, N. J., for reshipment by water, of $1.40 on prepared sizes, $1.30 on pea, and $1.15 on buckwheat. The distance from the Beaver Brook Colliery to Elizabethport is 140.5 miles and from Coleraine slightly greater. The distance, for which the rates in the Meeker case, supra, were prescribed, is 164 miles. The lines of the defendant and the Lehigh Valley are but a short distance apart and extend in the same general direction.

The Lehigh Valley and other roads in the territory from which complainants ship maintain lower rates for the same or longer distances than the rates of defendant. The earnings of the defendant from those rates complained of, assuming an average loading per car of 39 tons, are 43 cents per car-mile on prepared sizes, 39 cents on pea sizes, 33.3 cents on buckwheat No. 1, and 30.7 cents on smaller sizes. By stipulation testimony in the anthracite investigation relating to the cost of moving coal from the mines to tidewater was made a part of this record. This shows that the average operating cost per gross ton to the defendant for transporting coal from the Lehigh region was 44.35 cents. In Red Ash Coal Co. *vs.* C. R. R. of N. J., 37 I. C. C., 460, and Rates for Transportation of Anthracite Coal, 35 I. C. C., 220, 264, it was found that these cost figures were substantially accurate.

This defendant insists that the rights of complainants should not be differentiated from those involved in Rates for Transportation of Anthracite Coal, supra. In that case the commission prescribed, from a group which includes the points from which complainants ship, rates to Elizabethport when consigned free on board vessels or for reshipment by water as follows:

Prepared sizes	$1.45
Pea size and smaller	1.35

Complainants filed herein exhibits giving details of shipments and dates when the charges under the existing rates were paid. These exhibits the defendant was given the right to check and their accuracy has not been questioned. Upon the record herein we find:

(1) That during the period from May 31, 1912, to July 31, 1914, inclusive, complainants Charles M. Dodson & Company made certain carload shipments of anthracite coal from Beaver Brook colliery and Coleraine colliery to Elizabethport, N. J., for transshipment by water.

(2) That such shipments aggregated 47,342.27 gross tons prepared sizes and 1,119.01 gross tons pea size.

(3) That complainants Charles M. Dodson & Company paid and bore thereon the established tariff rates of $1.55 on prepared sizes and $1.40 on pea size.

(4) That said rates so paid were excessive and unreasonable to the extent that they exceeded $1.45 on prepared sizes and $1.35 on pea size, which latter would have been reasonable rates for the service.

(5) That complainants Charles M. Dodson & Company were injured and damaged by the payment of said unreasonable rates to the extent of the difference between the amount paid at the rates herein found unreasonable, and the amount it would have paid at the rates herein found reasonable, and that the damages amount to $4,790.18, together with interest at 6 per cent from September 1, 1913.

(6) That during the period from January 20 to January 31, 1913, inclusive, complainant Weston Dodson & Company made certain carload shipments of anthracite coal from Coleraine colliery, Pa., to Elizabethport, N. J., for transshipment by water.

(7) That such shipments aggregated 228.14 gross tons prepared sizes, upon which said complainant Weston Dodson & Company paid and bore the established tariff rate of $1.55.

(8) That said rate so paid was excessive and unreasonable to the extent that it exceeded $1.45, which latter would have been a reasonable rate for the service.

(9) That complainant Weston Dodson & Company was injured and damaged by the payment of said unreasonable rate to the extent of the difference between the amount paid at the rate herein found unreasonable and the amount it would have paid at the rate herein found reasonable, and that the damages amount to $22.81, together with interest at 6 per cent from February 27, 1913.

Upon these findings we conclude that an order should be issued authorizing and directing defendant to pay to complainants the amount of the damages by them respectively sustained, together with interest thereon. An order will issue accordingly.

Upon this record we are unable to find that the rates complained of on sizes smaller than pea are unreasonable. As the rates herein found reasonable have been ordered to be published and to be maintained as maximum for the future in Rates for Transportation of Anthracite Coal, supra, no order as to the maintenance for the future of the rates herein found reasonable need be made in this case.

Increases Coal Rates

Following 1915 Western Rate Advance Case, 35 I. C. C., 497, 603-611, proposed increased rates on bituminous coal from Illinois mines and other points to points west of the Mississippi River are found justified by the Commission.

A portion of this decision reads as follows:

"The increased rates proposed on bituminous coal affect the identical territory that was affected by similar increases found justified in The 1915 Western Rate Advance Case, supra, and the justification offered in that case is repeated here. Many of the increases were not protested. The Southern Coal, Coke & Mining Company and the Ayrshire Coal Company protested the increases proposed in certain tariffs of the Illinois Southern Railway and of the Southern Railway Company's St. Louis-Louisville divisions, and other coal dealers and shippers appeared at the hearing to join in the protests.

"Illinois Southern Railway tariffs I. C. C. Nos. 640, 641, and 642 were suspended until December 29, 1915. Increased rates were proposed in them analogous to the rates from the same general territory and to the same points that were found justified in The 1915 Western Rate Advance Case, supra, and are justified by respondents in the same way. A witness for the Illinois Fuel Company argued that his company is located in the so-called inner group of southern Illinois coal mines and, being nearer to the points of destination involved, should be subjected to slighter increases than had been made from the outer group. The two groups are described in The Illinois Coal Cases, 32 I. C. C., 659, 663, 676, 682. The proposed increases now before us merely preserve the previous relationship between the rates from the two groups.

"Southern Railway tariffs I. C. C. Nos. C-1665, C-1666, and C-1667 proposed increases from points on the Southern Railway which would harmonize with the rates heretofore found justified from points on the Illinois Central Railroad and the rates herein found justified from points on the Illinois Southern. The facts stated in connection with the rates proposed by the Illinois Southern apply equally to the rates proposed by the Southern.

"Litchfield & Madison Railway tariffs I. C. C. Nos. 123, 124, and 125 proposed increased rates that would conform generally to the increased rates heretofore made by other carriers. The increases are not protested, and the order suspending the tariffs proposing them expired December 29, 1915.

"We find that the increased and proposed increased rates on bituminous coal have been justified."

Complaint Dismissed

In the cast of Bennett & Son *vs.* Chesapeake & Ohio Railway Company, the following decision was rendered:

1. Rates for the transportation of bituminous coal in carloads from the Kanawha and New River districts in West Virginia to Culpeper and Manassas, Va., not found unreasonable, and the complaint dismissed.

2. The inhibition of the long-and-short-haul clause of the fourth section is not restricted to movements over the line of a single carrier, but extends to transportation over routes in which one or more carriers participate.

3. The defendants' fourth section applications which seek authority to continue lower rates on coal from the Kanawha and New River districts to Alexandria, Va., and Washington, D. C., than to Culpeper and Manassas, Va., granted in part.

Test Found Reasonable

In the case of the National Petroleum Association *vs.* Atchison, Topeka & Santa Fe Railway Company upon complaint alleging that the requirement that tank cars employed in transporting inflammable liquids shall be subjected to an interior cold-water pressure test of 60 pounds per square inch is unreasonable, unnecessary, and operates to the injury of complainants, the Commission held:

1. That the primary purpose of the test, prescribed after an extended investigation, is to insure, in a measure, the strength and stability demanded of containers employed in the transportation of these inherently dangerous commodities.

2. That the prescribed degree of the pressure test represents the best judgment of experienced tank-car builders and technical experts, and is more reliable and contributes to a greater degree of safety than would a less rigorous test.

3. That the rule is a regulation of the use of instrumentalities of commerce employed in a dangerous service, and, being otherwise reasonable, does not, because of the fact that it entails some expense upon the owners and operators of tank cars, impose an unjust burden upon them. The complaint was dismissed.

Found Discriminatory

In the case of the South Canon Coal Company *vs.* Colorado Midland Railway Company, the rates on bituminous coal in carloads from South Canon, Colo., to destinations in Wyoming, South Dakota, Nebraska, and Kansas were found to be unjustly discriminatory in so far as they exceed the rates from Walsenburg, Colo., to the same destinations by more than 25 cents per net ton. The rates from Cameo, Colo., were not shown to be unjustly discriminatory.

Must Reweigh Cars

In the case of the Detroit Coal Exchange *vs.* Michigan Central Railroad Company and Grand Trunk Western Railway Company, upon complaint that the rules and charges governing the weighing and reweighing of carload freight in Detroit, Mich., are unreasonable and unduly preferential, the Commission held:

1. That the Commission has jurisdiction of the weighing service, when the freight is moved in interstate commerce.

2. That it is the duty of the delivering carrier, upon reasonable request, to reweigh carload freight which has been transported in interstate commerce.

3. That the present charges for this service in Detroit, Mich., are unjust and unreasonable. Just and reasonable charges prescribed for the future.

4. That the inability of carriers participating in the interstate transportation of a car to agree upon their respective assumptions of costs for reweighing when such reweighing develops a shortage in excess of the limit of tolerance can not be used to increase charges against the shipper.

Find Rate Unreasonable

In the case of the Picher Lead Company *vs.* Missouri Pacific Railway Company, the rate of twenty-one cents per 100 pounds charged for the transportation of fire-clay retorts in carloads from Altoona, Kans., to Joplin, Mo., was found to have been unreasonable to the extent that it exceeded eight cents per 100 pounds. Reparation was awarded.

Hearings Scheduled.

Cases of interest to the mining industry will come before the Interstate Commerce Commission as follows:

April 7—Oral argument in Washington. No. 6210. In the matter of rates on iron ore in carloads from Lake Erie points to Points in Ohio, West Virginia and Pennsylvania.

April 8—I. & S. 740. Coal to Missouri stations.

April 13—Oral argument in Washington. I. & S. 755. Illinois and Indiana coal.

April 14—Oral argument in Washington. Coal Operators Traffic Bureau of St. Louis vs. Terminal Railroad Association of St. Louis.

PERSONALS

Clarence Hall, a widely known chemical engineer, of Pittsburgh, was in Washington last month on business. Mr. Hall formerly was with the United States Bureau of Mines, and is now a member of the firm of Hall and Paul, consulting engineers, Pittsburgh.

Charles S. Keith has returned to his home in Kansas City, Mo., after a business trip in the East.

W. F. Horton, a mining technologist of the Bureau of Mines, has resigned to accept services with the Sterling Steel Company.

Gordon Surr, assayer and analyst, of San Bernardino, Cal., is now connected with the University of California citrus experiment station at Riverside.

Prof. Waldemar Lindgren, formerly of the U. S. Geological Survey, and now head of the Department of Geology in the Massachusetts Institute of Technology, lectured on the teaching of Geology before the Phi Beta Kappa Society of Washington, at the University Club, banquet, February 26.

B. Bryan, of Washington, D. C., expects to go to South America this month for further geological reconnaissances. His work will be done on the west coast for the most part.

Dr. Ralph Arnold came from New York to Washington and Mrs. Arnold came from California to attend the Pick and Hammer banquet, February 26.

Dr. Arnold was formerly a member of the United States Geological Survey staff. He still does special work for the Survey and the United States Bureau of Mines. He is a trustee of Stanford University.

Chester W. Washburne, formerly with the United States Geological Survey has returned to the United States after two years in the Belgian Congo where he went to prospect for oil for the Forestiére et Minière du Congo Belgique. Mr. Washburne also did some work in Portugal, Spain and northern Africa before returning. He reached Washington February 26, in time to attend the Pick and Hammer banquet.

J. E. Spurr recently made a journey to the Hudson Bay region, several hundred miles beyond the railroads. From there he went to Nicaragua. He was in Washington February 28.

C. P. Dam left for Lillouet, B. C., by way of New York, March 1. He is taking two Empire drills with him to test gold bearing gravels about 40 miles from Lillouet. The snows have been very heavy according to reports received by Mr. Dam. Two and one-half feet fell during a four-day blizzard, upon four and one-half feet of packed snow which already covered the ground.

W. A. Bechtel, of San Francisco, who is interested in irodosmine and platinum bearing placers in Coos County, Ore., was in Washington recently.

Dr. Guestaro Mann, formerly a professor at Tulane University, New Orleans, was in Washington during a part of last month. Dr. Mann is interested in the problem of cracking oils.

Van H. Manning, Director of the Bureau of Mines, was in New York the latter part of March conferring with the officials of the American Institute of Mining Engineers, with regard to the contrinuance of the cooperation which that organization has been giving the Bureau.

B. Britton Gottsberger, of Miami, Arizona, is now in the East. He was a caller at the Mining Congress office early last month.

D. W. Brunton, of Denver, Colorado, former President of the American Mining Congress, has been spending some time at Nassau, Bahama Islands, and will later go to British Columbia.

Senator Thomas Kearns, of Salt Lake City, who is making an extended trip through Central America, is expected home April 1.

Falcon Joslin, formerly a director of the American Mining Congress and president of the Tanana Valley Railroad of Alaska, who has been spending several weeks in the East, has returned to his home in Seattle. He was a caller at the Mining Congress office during the month.

James F. Callbreath, secretary of the American Mining Congress, has returned to the Washington headquarters after a trip to New York, Boston, Cleveland and Chicago, in the interest of the membership campaign being carried on by the congress.

Eli T. Conner, a mining engineer, announces the removal of his principal office from Philadelphia to 26 Liberty Street, New York.

J. F. Erisman, of the Blue Flag Mining Company, of Denver, has been spending some time in the East. He recently was a caller at the office of the Mining Congress, and expressed his very high appreciation of the MINING CONGRESS JOURNAL, as a magazine of great usefulness to the industry.

Falcon Joslin, of Fairbanks, Alaska, and New York, spent several days in Washington early in the month.

Dr. Henry Mace Payne is again in New York, after a long absence on professional business in Siberia.

B. Britton Gottsberger, of the Miami Copper Company, of Arizona, has been spending some time in the East, in conference with J. Parke Channing, president of the company. Mr. Gottsberger expects to return to Arizona by way of Washington.

GEORGIA BAUXITE DEPOSITS BEING WORKED ACTIVELY

Bauxite deposits in Georgia are being worked with great activity. W. C. Phalen, of the Geological Survey, is engaged compiling some data secured on a visit to Wilkinson and McIntyre Counties. None of this ore is reduced in Georgia. Most of it is shipped to chemical factories in the East and reduced to alum. Some small proportion finds its way into metallic aluminum. Georgia bauxite is in considerable demand as it is a source of an excellent grade of alum which is considerably sought after by paper makers. Some of it also is used for clarification of water and as the mordant in dyeing.

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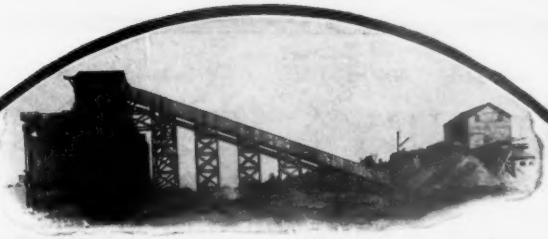

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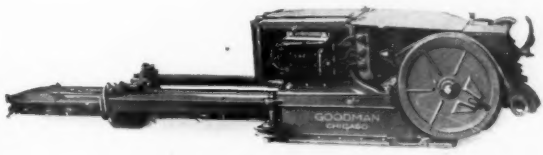

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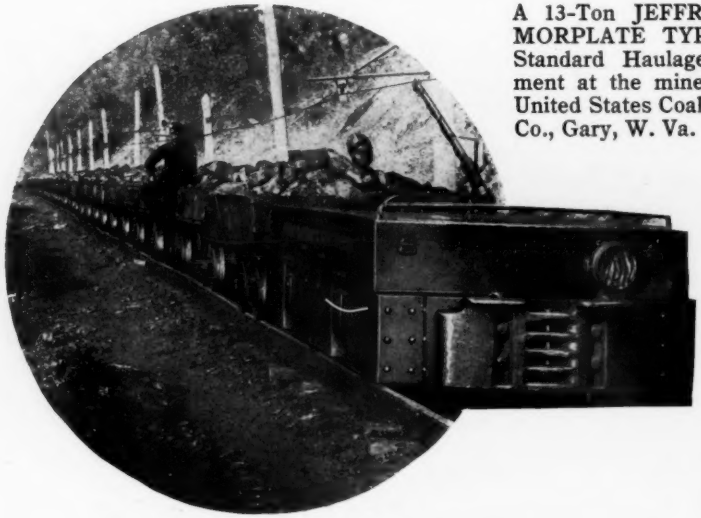

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